Smithsonian

November 1988

Snowy egrets flaunt the plumes that almost did them in (p. 104)

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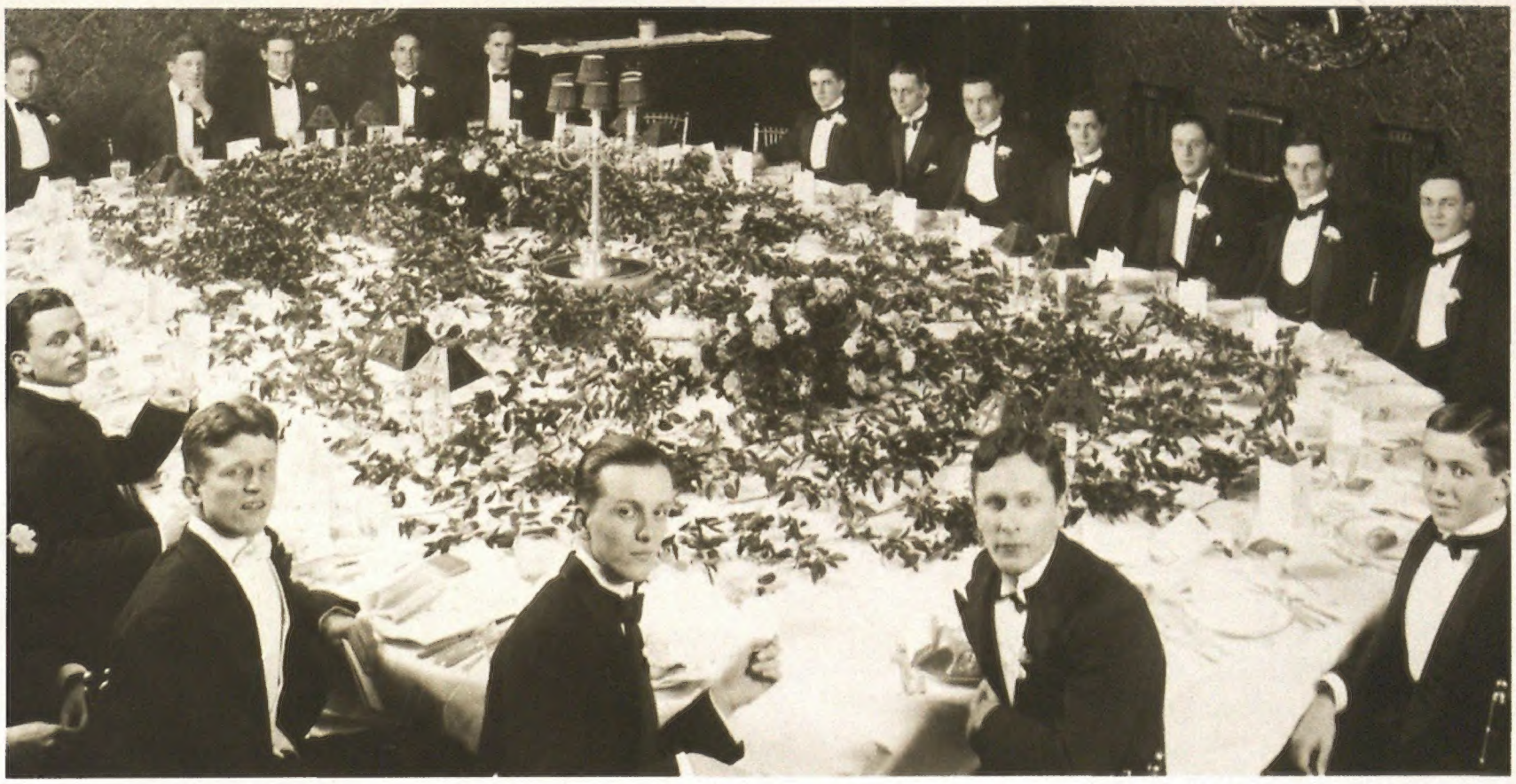

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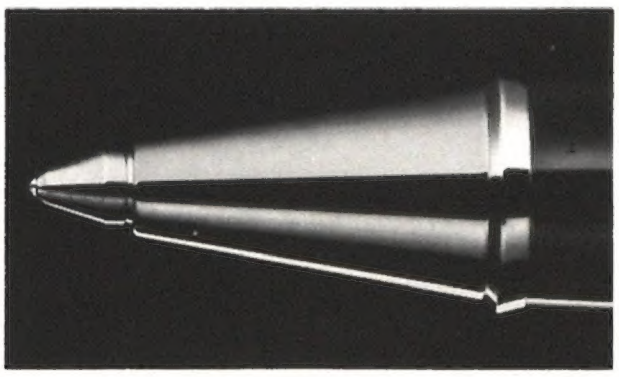

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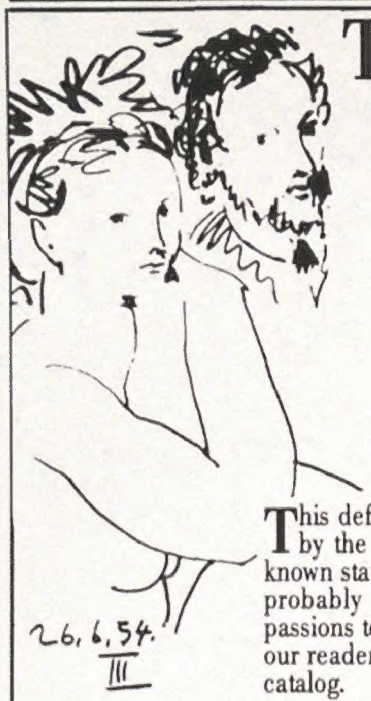

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Secretary Adams' comments

Smithsonian horizons

The policy of cultural mitigation, as applied to a new dam, has given us an unusual museum in Colorado

Late last summer I had a heartening opportunity to participate in the opening of a new kind of exhibition and research facility in southwestern Colorado. The facility is the result of "cultural mitigation," as it is called, for the new McPhee Dam built on the Dolores River, above the town of Dolores and not far from Mesa Verde National Park. The impounded waters, now forming a recreational lake and irrigation source, overlie a valley bottom in which there was extremely dense aboriginal settlement. Many hundreds of archaeological ruins have now been permanently submerged, the great majority of them dating between A.D. 600 and 1250.

These days cultural mitigation is a required part of any federal project, and by the time the waters rose in McPhee Reservoir the salvage program in this region had grown to an unprecedented scale. Some 2,300 sites were mapped, recorded and analyzed through surface collections, and in addition almost 150 of them were sampled by excavations.

Now providing a permanent repository for the study and exhibition of these findings is the imposing new Anasazi Heritage Center, named for the predecessors of the Pueblo peoples. It is set into the hillside below 12th-century Anasazi ruins that were first noted in the journal of a Spanish priest who passed through the area in 1776. They were excavated and dedicated as Colorado's only Bicentennial site in 1976. Apart from promoting further research on the prehistoric past, the center is devoted to deepening public understanding of the continuities of human occupation in the region as a whole, up to the present time. Like dam building, all archaeology involves an initial phase of destruction. But dam building and archaeology both also promise a permanently enhanced harvest, whether of crops or of knowledge of long-term patterns of land use, water management and settlement.

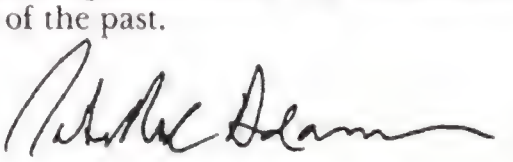
The Anasazi Center is a gracious semicircular building of native stone. Surrounding a sunken court, it is inspired by Pueblo Indian prototypes with their great sunken kivas, in which religious and ritual life was concentrated. Constructed by the Department of the Interior's Bureau of Reclamation on behalf of its sister agency, the Bureau of Land Management, it is the first—one hopes not the last—venture of the latter into operating a museum.

Capacious storage rooms and laboratories are set aside for archaeological collections and their ongoing study, not merely from the areas now permanently flooded but from surrounding regions into which archaeologists will surely venture with increasing frequency in years to come. On the main floor is the visitor center, documenting ancient Anasazi life, the recovery methods of contemporary archaeology, and the principles of multiple land use to which the Bureau is pledged. It is above all an *active* facility, with computerized data bases, a lively mix of temporary as well as permanent exhibits, a discovery room for hands-on experience, a circulating library, well-equipped quarters for meetings and educational programs, and an enthusiastic staff.

A highlight of the exhibits is the collection of Ruth Chappell and her late husband, Cliff—900 ceramic vessels found on private lands over a period of 50 years and now on permanent loan. Mrs. Chappell was honored at the dedication ceremonies. Honored along with her was Andrew J. Senti, who as a BLM realty specialist very narrowly managed to succeed in withholding the site of the center from public auction some 30 years ago.

Their contributions are expressive of the public-private partnership that this center embodies. Apart from the two federal agencies and hundreds of archaeologists who were involved, dozens of citizens' groups participated in the years of effort that brought the Anasazi Center into being. Surely accounting for such enthusiastic support, at least in part, is its central objective: the permanent bringing together within their region of origin of more than two million artifacts, the greater part of which would otherwise have been transferred to distant museums.

The effect has been to enlist broad participation in the lengthy process of educating the public, documenting the ruins and, above all, safeguarding them against the kind of savage grave robbing and looting of the American Indian cultural heritage that in recent years has spread across our public lands like a plague. Archaeology is primarily a science of establishing contexts for the material residues of ancient behavior. Irretrievably lost when the looters set to work, often these days with bulldozers, are the temporal and spatial associations on which an understanding of context must largely be based. Without context we are left with only pots in display cases, shorn of the greater part of their significance for the reconstruction of the past.



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Letters to the Editor

Soap bubbles

Dear Sir: I grew up in a bubble-crazed family. My father, a carpenter by trade, was constantly bending coat hangers into interesting shapes in the quest for the ultimate bubble. In the early 1960s he succeeded in producing a device that made a large bubble with a smaller one inside. It had the neighborhood kids—as well as his own—spellbound. Patented, it was put into limited production but didn't achieve wide distribution. After a while it was forgotten, except for the kids in our family, who had an abundance of bubble toys for years to come! Now we are letting our children and our nieces and nephews play with the few that are left. We wouldn't trade them for the world.
John F. Defelice jr.
South Hamilton, Massachusetts

Elephants

Dear Sir: During my high school years in California's Tehachapi Mountains, a lot of the work on the family ranches involved building land bridges across washed-out crevices and ravines. Often our trucks and tractors became mired to the undercarriage in mud or sand. Fortunately, our neighbors across the road, the Drakes, were in the entertainment business. They operated a traveling circus, and trained elephants for it and for the movies. These kindly neighbors often pulled our stuck vehicles from the depths with their friendly elephants.
Lance M. Turner
Huntsville, Texas

Dear Sir: Last year, I was fortunate enough to spend a few days at Tiger Tops in Royal Chitwan National Park in Nepal. When its elephants must stand in the hot sun without shade, they will pluck a large thatch of grass to place on their heads for protection [below].

As with Dinerstein's group, it is not economically feasible for Tiger Tops to breed its elephants. There was, however, one baby among the dozen or so at the camp. Some years ago a male and one of the females broke free from their leg irons one night and disappeared into the jungle for three days. A good many months later the camp was awakened late one night by a mighty trumpeting. Investigation revealed that the female had just given birth and that another female had broken loose from her chains to stand by her side during the ordeal.
Stanley B. Dickes
Fresh Meadows, New York

The DC-3

Dear Sir: I first flew a DC-3 in October 1941, as a new second lieutenant in the U.S. Army Air Corps. When I retired from the U.S. Air Force 25 years later, I had accumulated almost 5,000 hours in—and was still flying—the military version, the C-47.

At one time in the mid-'50s I was commander of a squadron of 15 C-47 "Gooney Birds" with a special mission. Ours had extra fuel tanks, as the mission required extensive range.

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When it was necessary to land on a cow pasture or strip of grass (usually very soft and often muddy) the takeoff was made with the help of four jet-assisted-takeoff bottles affixed to the bottom of the wing; "wheels off" a soft, grass field could be accomplished in less than 200 feet. Each airplane also carried three shovels to dig the plane out if it was stuck in the mud. During the winter months the aircraft were fitted with skis. I'm convinced the Gooney Bird could do almost anything!
Robert G. Bjoring, Lt. Col. USAF (ret)
Menlo Park, California

Dear Sir: One night in the late 1930s, near Greensburg, Pennsylvania, a Pennsylvania-Central Airlines DC-3 was flying over the rough terrain of Westmoreland County when both engines suddenly failed. The captain turned on the landing lights and, sighting an upward sloping field, gradually pancaked the plane so it slid up the slope, coming to rest just short of a rural highway. There were no injuries to those aboard and the major damage to the plane was bent propellers.

As the captain stepped out of the plane, he flushed a nesting grouse. He reported later, "*That* scared the hell out of me!"
Jim Griffith
Port Richey, Florida

Dear Sir: Stories of the DC-3 and C-47 Gooney Bird are incomplete without reference to pilot comfort when flying through rainstorms. The AAF and USAF always had a large library of manuals and charts on board. The purpose of the charts was to cover the pilot's left leg and the copilot's right leg when flying in aqueous precipitation, since the side windows always leaked. In addition, we almost always flew with a crew chief. One of his functions was to stuff rags around a hatch in the cockpit ceiling during inclement weather. Most of us regarded this as a design feature probably included by Mr. Douglas to help keep us awake, since flying the airplanes was such a piece of cake.
James B. Johnson, Maj. USAF (ret)
Goulds, Florida

Dear Sir: As an air hostess for Air Jordan in 1957, I flew throughout the Middle East and North Africa in our fleet of DC-3s and one reconverted C-47.

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through some very rough weather; I remember a hailstorm that sounded like the plane was being shot up by machine guns. The windows were covered with ice and the wings shivered, but our plane plodded steadily on, bringing us safely to our destination. Never for a moment did I fear that something could go wrong.
Veronica de Clios Fracalossi
Woodside, New York

Dear Sir: The venerable and much loved DC-3, to most pilots who rode her cockpit, was as reliable as a pioneer wife, as free of treachery and deceit as an angel, and as obedient as a shadow. Give her time—and respect her method—and she would do almost anything asked of her.

The old bird has outlived most of the pilots who flew her and I suspect will continue to do so, in her warm and friendly way, for another generation at the very least.
Jack D. Bruce
Carmel, California

Dear Sir: Your article reminded me of a cartoon tacked on a shop wall at an old Capital Airlines hangar at National Airport: a DC-3 was shown parked at the gate, loading passengers. In the background was a battered hulk of an aircraft being towed past the terminal, obviously headed for the scrap heap. The caption: "There goes the last of the Big Jets."
W. C. Lukens
Alexandria, Virginia

Computer bulletin boards

Dear Sir: Your article *finally* explains to my family and friends why I spend about three hours on my computer each night. They thought I was ignoring them for nothing. Please know that the world of BBSing also offers comfort to those who need a friend at any hour.
Laurie A. Saidiner
Van Nuys, California

The Post Office

Dear Sir: Mr. Page certainly encountered extraordinary people with obvious dedication to their jobs. I just wish he could come to Columbus and trace one of my letters mailed to my mother in Cincinnati, 112 miles from here.

Ordinarily it takes at least three days, sometimes five. Four or more letters, postmarked on consecutive days, have been known to arrive in one batch.

Then there is the marvelous fun of finding my mail at someone else's home—the same house number, different street, at least once every two weeks.

The crowning blow was the letter, correctly addressed, marked "No Such Address" and returned to me the very next day!

The Pony Express had its advantages.
Beverlee Tague
Columbus, Ohio

Dear Sir: I routinely receive mail from Santa Fe, and I have yet to receive a letter in less than the three-day delivery standard. Mr. Page's article would have been much more informative if he had reported on why the U.S. Postal Service is unable to meet its delivery standards, particularly in New York City.
Jeffrey Travis Atwood
Bloomfield, Connecticut

Dear Sir: Friends sent us a picture postcard from Portland, Oregon, on July 2. It arrived on July 8, which seemed a bit tardy, even considering the holiday weekend. However, the card probably should have gone to the dead letter office; the address bore no state or ZIP Code. Our locality *is* well known around the country, but my atlas informs me that there are 12 Williamsburgs in the United States and one in Canada. The U.S. Postal Service far outdid itself on this one.
L. Howard Reagan
Williamsburg, Virginia

Cook-offs

Dear Sir: Back in the 1930s, when you chopped your own wood for the cookstove, gathered your own eggs and beat the whites by hand, my dear future mother-in-law decided to enter her famous angel food cake in the county fair. It was perfection and ready to go, in a fancied-up box, on the backseat of the car. Sure 'nuff, one of her little boys hopped in and plopped down on it. Laughing in her good-natured way, Mom took it on to the fair anyway.

Well, that cake was so light and so spongy, it literally "rose to the occasion." The judges never knew what a funny thing had happened on the way to the fair: she won first place.
Mrs. Charles D. Hanger
Ponca City, Oklahoma

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Around the Mall and beyond

A polar bear sits quietly on the rock shoulder of a bleak Hudson Bay island. It's a quarter of a mile away, but it sends a shiver up your spine. A minke whale silently surfaces and blows, a hundred yards off the bow of your inflatable boat as you swirl across roiled, ice-cold waters at the foggy entrance to Davis Strait. Your chilled body surges with sudden warmth. A ghostly iceberg, bigger than your ship, is neatly framed in the window of your cabin as you look out at dawn. It makes your whole day. And the incredible colors of a long, tremulous Arctic sunset end that day elegantly.

OK, it sounds like a travel agent's come-on. But some 120 sensible and sophisticated Smithsonian devotees will now agree with that paragraph and come up with plenty more of the same.

These are things we saw last summer on the Smithsonian's first adventure cruise for its Contributing Members. For 16 days participants escaped the greenhouse heat of the States and breathed the cool, clean air of the Far North. Because I had behaved quite well for a number of weeks, I was allowed to go along.

Gathering in Winnipeg, we eyed fellow voyagers a little suspiciously—diverse men and women from 28 states, the District of Columbia, the Virgin Islands and County Galway, Ireland. We explored the city's enviable Museum of Man, got to know one another at a hotel reception, slept fitfully and rose early to make the plane for Churchill, an old Hudson's Bay Company town on the western shore of the bay. Here we boarded the motor vessel *World Discoverer*, a 285-foot German-built cruise ship, sturdy enough to crack through growlers—small icebergs. This would be our home for a fortnight as we did things that few

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Feria de Abril: Springtime in Seville.

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At "Las Fallas" in Valencia 20 foot high sculptures are burned to cleanse the old and make room for the new.

Stilt dancers in Anguiano celebrate the Feast of Mary Magdalene. There's the extraordinary running of the bulls in Pamplona and the Burial of the Sardine in Murcia.

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cruise passengers have ever done before.

Carrying our group, *World Discoverer* was the first cruise ship to visit the western shore of Hudson Bay. When our bow thruster pushed us away from Churchill's dock that first night, we became the first passenger vessel ever to leave this port. We stayed up for it, checking the northern lights, quietly aware that we were embarking on more than the usual "luxury cruise."

I never saw those beautiful people in *Love Boat* hop from their ship's landing stage to a pitching, inflatable tender, huddle against freezing bow spray as they sped toward a pebbly beach, wade ashore, plunge across tundra in search of a snowy owl or the tiny droppings of lemmings, or a burial from the days of the ancient Thule culture, or a rare relic of Precambrian rock rippled by ancient waves, or a rapturous glimpse of Arctic fireweed or woolly lousewort amid the reindeer moss. We did all these things as a matter of course. We were the Smithsonian and we were hot for knowledge.

I sometimes felt, during those two weeks, that we were making more landings than the 1st Marines did in 1944. We sailed up the western shore of the Bay and hit the beaches at Eskimo Point and Rankin Inlet. The Inuit (they prefer that to "Eskimos") flocked to greet us. Most arrived at the beachhead on the snarling little all-terrain vehicles that have quickly become ubiquitous in Inuit hamlets. Some Honda salesman must have cleaned up in Canada's Northwest Territories.

Welcoming speeches rang out in community halls. One elder broke into a passionate oration that was translated as an expression of warm friendship. For all of me, he could have been threatening to stake us out for the polar bears.

We landed at Marble Island and Deadman's Island, where Yankee whalers sometimes wintered over—and in many cases died. We anchored off lonely Walrus Island and circled it in the Zodiacs while two polar bears eyed us morosely from the rocks, and herds of massive walrus basked in the meager sun and cooled off in the water, always keeping their young pups in the middle of the group. When you get downwind from walrus, you can smell them—like the Chicago stockyards.

And so on: Native Point on Southampton Island, where the Smithsonian's famous anthropologist, the late Henry B. Collins, spent months of study; Cape Pembroke on Coats Island, where thousands of murres nested on a high Precambrian cliff; Cape Dorset on Baffin Island; whales and bears around the Button Islands; the "medium" swells of Hudson and Davis straits (heavy to us), where we passed our first icebergs; the jagged mountains of Greenland at sunrise.

Greenland: the same Inuit people, but in a distinctively Scandinavian environment: clean, green fields; tall Nordic churches; deep, clear fjords; bright-colored homes. Here Erik the Red settled, and lured colonists by calling the place "green." Yet he was right. I, among others, climbed over a ridge and looked down on Eriksfjord, where old "red beard" had lived, and along its shores were verdant meadows, straight from Vermont.

We reached Iceland after two days at sea in North Atlantic swells, now a little more than medium. But as they grew, so did our sea legs. After leaving the ship at Reykjavik, we had trouble keeping

The Buckingham Wile Company, N.Y. © 1988. 40% Alc. by Vol.

He knew then, after the music, the dancing, and the long, long, conversations over B&B, that

Tour members (many clad in red parka trip "uniform") explore glacial tundra and remains of Norse church in Hvalsey, Greenland.

the Hotel Saga from pitching as we walked its plush corridors. Tourist buses took us to geysers and lava fields and a thundering waterfall at our "farthest north"—a few miles nearer the Pole than Cape Dorset on Baffin Island.

How did it all come about? Back at the old Smithsonian, Fern Segerlind, Program Manager for the Contributing Members, got together with Barbara Tuceling, who runs the Associates Travel Program. They thought it might be an exciting idea to offer these special contributors the chance to visit areas unaffected by tourism. Difficult? "Sure," Fern told me, "but Smithsonian travelers are intrepid. We knew they could handle it."

Barbara linked up with Larry Hobbs, a favorite study leader on previous Associates tours, and with Peter Voll, a veteran Smithsonian tour manager. Together they scouted the Hudson Bay area and were utterly wiped out by its unspoiled serenity, its richness in animal and plant life, its spectacular geology and the story of its people with their ancient aptitude for survival. The Smithsonian consensus was: "Let's do it." Ap-

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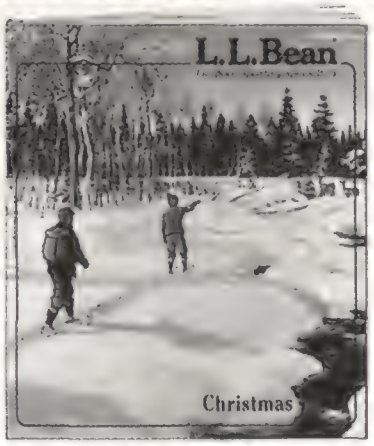

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T·H·E C·L·O·I·S·T·E·R

plications poured in. Fern Segerlind lined up four study leaders from the Smithsonian. Jeff Post transmitted so much of his enthusiasm for geology that some claimed *World Discoverer* began to list because of the rock samples that passengers packed aboard. On a day when the ship's lecture room rose and fell like a New York elevator, Jeff explained plate tectonics, and not a soul left.

Bob Hoffmann, the Institution's Assistant Secretary for Research, who has studied small Arctic mammals for years, led us on tundra hikes, sharpened our eyes to minute signs of life, and at sea kept us looking for murres, black guillemots and puffins.

Roaming with Stan Shetler, Acting Deputy Director of the Museum of Natural History, we grew accustomed to seeing him suddenly drop to his knees to fondle tiny, bright flowers, stunted by climate but burgeoning everywhere underfoot. We also acclaimed Stan's evening wrap-up sessions, always starting with a series of rapid-fire wisecracks the likes of which I haven't heard since Bob Hope visited Numfoor Island in '44.

And, of course, Sue Rowley, a new bride as well as anthropologist, charmed the socks off everyone as she led us through the ruins of ancient Inuit dwellings in Canada, and through a Viking church and great hall in Greenland.

I'm sorry it sounds like a high school essay: "What I Did on My Summer Vacation." But the ship's company, the tour people, the study leaders and the Contributing Members came together with unique serendipity that's hard to forget. We shared a great deal—not all of it comfortable.

I don't know about the others, but I shall always remember a swimming polar bear who turned toward our Zodiac, perhaps mistaking it for a large walrus with a cargo of seals, and headed toward it. We were grateful that the outboard didn't misfire. Also the spiky peaks of Greenland's mountains rising over Prins Christian Sund. Also the old Inuit who sat outside his house at Igaliko, Greenland, playing "Red River Valley" on his concertina. Also. . .

Enough. Yes, the Contributing Members will be doing it again, says Fern, one of our favorite shipmates on *World Discoverer.* Next time, a cruise into an area where the Smithsonian has long been conducting scientific research: the Amazon and Orinoco rivers. It's scheduled for October 1989.

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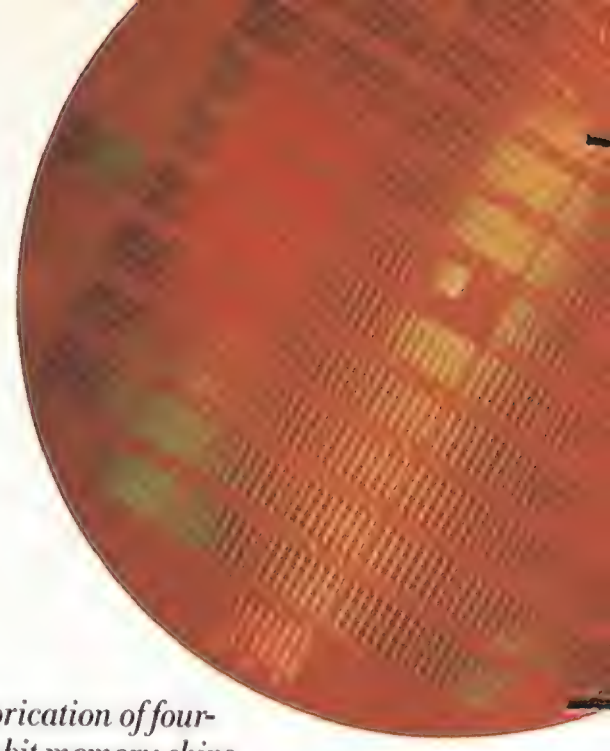

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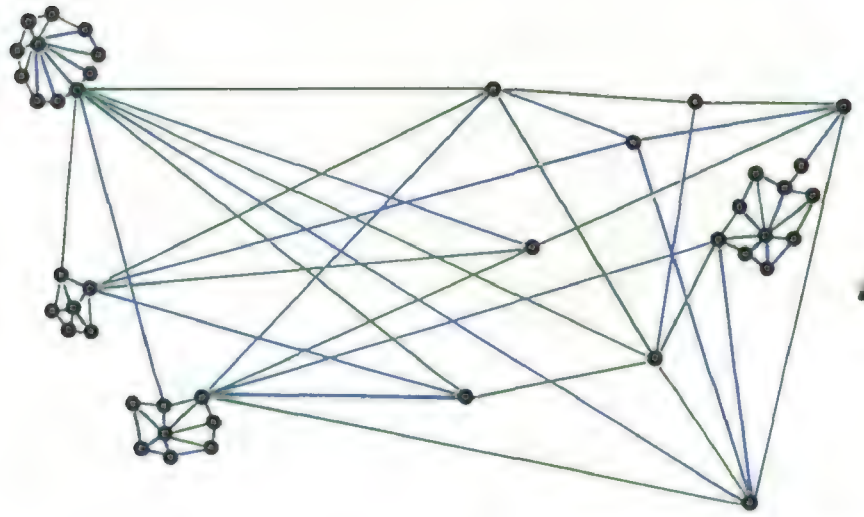

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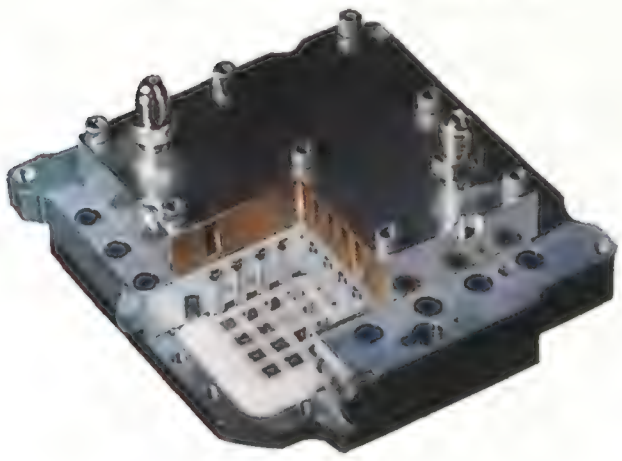

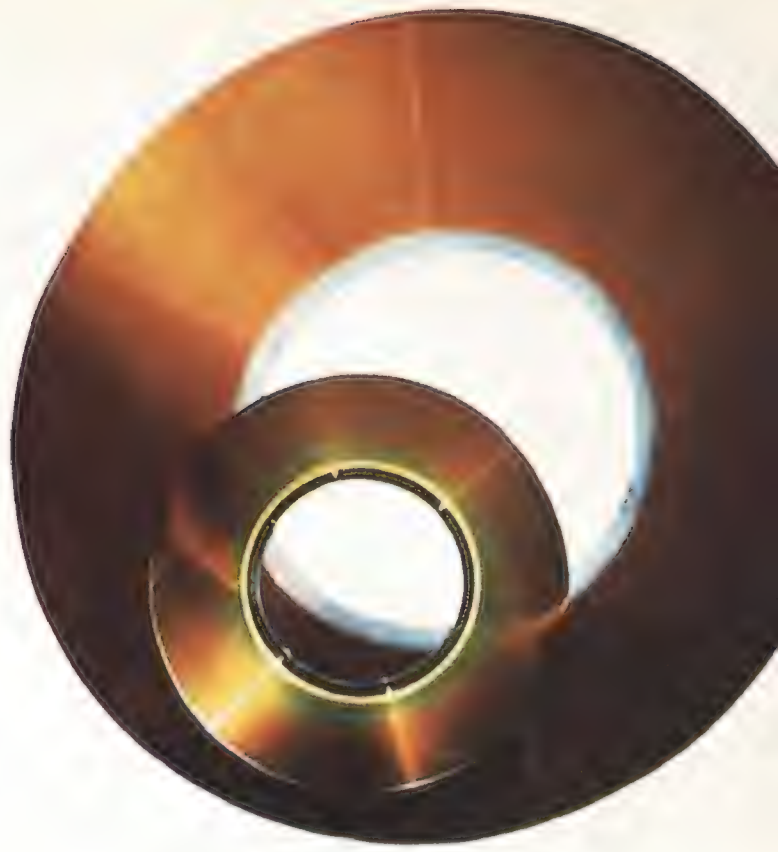

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Phenomena, comment and notes

A summer ecologist learns the limits of research—and develops an unlikely affection for a sequined polychaete

I've been smitten, captivated by a not-so-rare beauty, and most of my friends do not understand. My boss and colleagues inquire as to what productive things I did during my summer in Woods Hole; when told, they smile politely but their eyes question my sanity (it's a look I'm used to). Had I been bitten by a bug, things might not be so bad. In this case, though, I've been bitten by worms.

Now these aren't just any kind of worm. They're an ocean-dwelling species known to biologists who study them as *Diopatra cuprea*; to me they're diopatra. Distant cousins of the lowly earthworm, they belong to a marine group of worms, the polychaetes. For several glorious summer weeks spent at the Marine Biological Laboratory (SMITHSONIAN, June 1988), I was one of those people who study these worms. More accurately, I was a student of marine ecology. In getting to know my worms, I began to get an insider's appreciation for ecologists and how they work.

Though I have returned to pushing a pencil, I daydream of field work and lab work, of endless stretches of worm-inhabited sand flats and of aquariums filled with sequin-bedecked diopatra. But the romantic yearning is tempered by my new memories of the realities of such work—finding the right statistical methods to make sense of my findings, or trying to count sequins fast enough to keep up with the worms.

Sequins? Yes, science with an assist from the notions counter. Here's how it

A message from John V. Roach

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came about. I first came to admire these polychaetes while hunting for a summer research project. Imagine a large nightcrawler that has been flattened somewhat, then interbred with a fiery Chinese-festival dragon. That is diopatra. What attracted me more than their looks—and seemed the perfect problem for lab study—was a characteristic behavior: they are energetic builders.

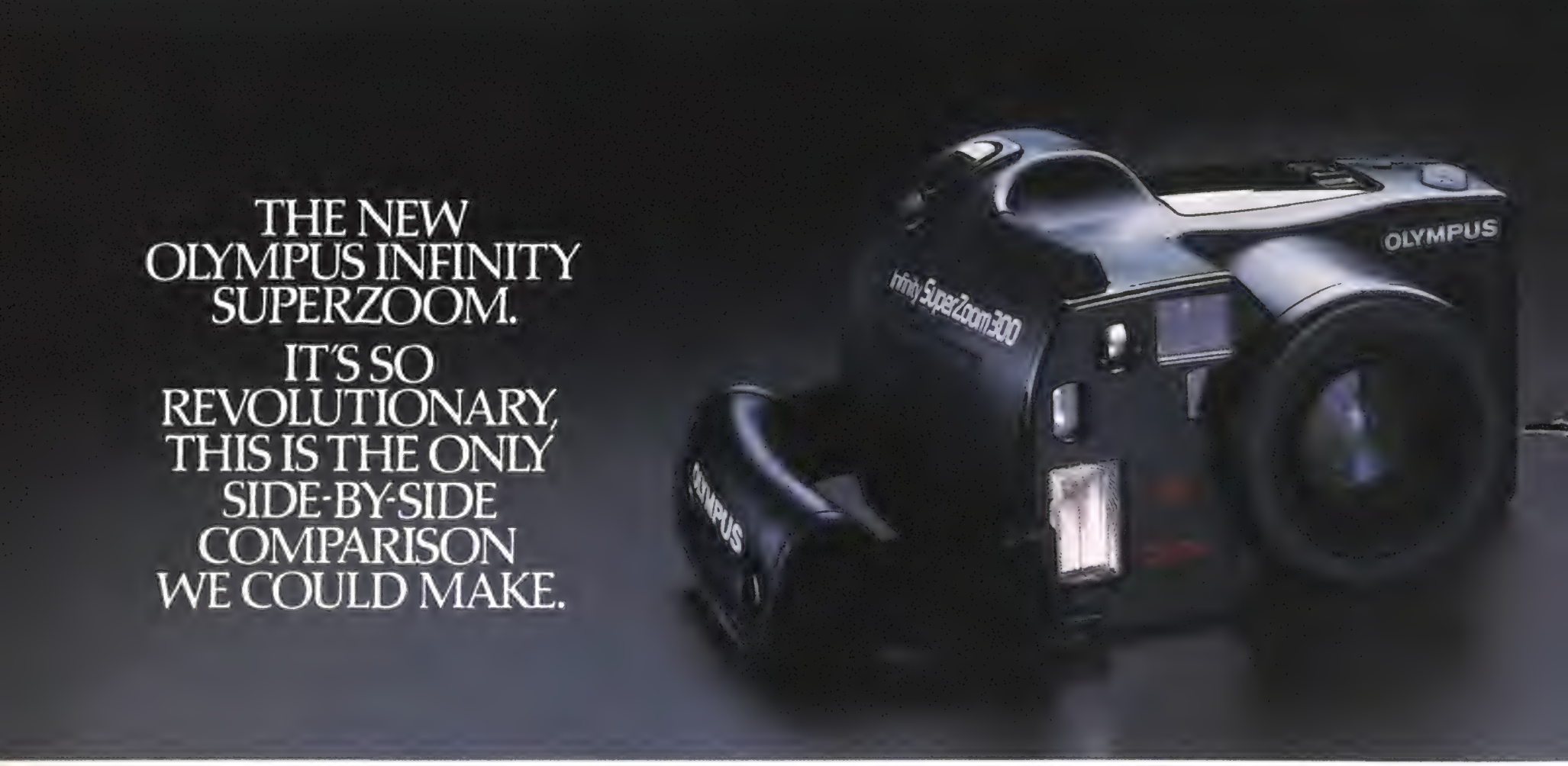
Diopatra dwell in sand and mud. They live on the ocean bottom in tough, parchmentlike tubes (made of hardened mucus and sand) that extend for a yard or more underground. Part of the tube, the debris-encrusted cap, curves a couple of inches up out of the sea floor. To make this entryway, a diopatra uses its jaws, the five tentacles on its head and the stubby pairs of appendages along its body to pick up nearly anything it can handle—shells or pebbles, bits of algae, grass or whatever drifts by—and cement it together with mucus and sand. This is your basic worm, with a minimal brain, few organs and no jointed limbs, but it uses bits of debris like bricks. Since most animals don't squander their energy, the diopatra's masonry skills must serve some purpose. But what might that be?

One theory particularly intrigued me: some marine ecologists have noted that tiny plants and animals inhabit the niches and surfaces of debris incorporated into the tube cap. The omnivorous diopatra is known to feed on these organisms and, as the theory goes, the worm may be "farming" its tube cap—creating and maintaining a habitat that attracts other living things, which it then eats.

I decided that one way to test this theory would be to see if, under ideal (but unnatural) conditions, a worm would prefer to build with objects that already had things living and growing on them (which it would detect through sensitive chemical receptors on its tentacles), or if clean material would serve the purpose as well. Such a project would be easiest to do in the lab, with worms in aquariums. I knew from my readings that diopatra do well in captivity, but little did I realize how well.

I had to have worms, so I went to a known diopatra field at low tide and dug in the tidal flats. After some effort, I had seven worms, each several inches long. After sifting hundreds of pounds of sand, making partitions to keep the worms apart, devising a seawater filtration system, I got four of my polychaetes situated in a large, fiberglass aquarium. The other three worms went into smaller glass tanks, making it easier to watch them in action. Then, committing what to some scientists is a cardinal sin, I named the three: Cleo-dio-patra, Princess Diopatra (or simply Di) and Midas.

With my worms happily entubed, I next had to determine what to give them as "clean" and "dirty" building blocks. The test objects had to be the same size, shape and weight, though it would be easier for me to use different colors for different treatments. In hearing of my dilemma, and knowing of my predilection for the flashy, a journalist friend in my course—at that time not a great fan of my worms—suggested I try sequins. Though she said it half in jest, I loved it; the worms seemed to as well. After cutting off the tube caps they had already built, I dumped a pile of the sequins on top of each. With tentacles waving wildly, they immediately set to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Sequin-studded "cap" built by seaworm serves as entrance to its tube abode.

work reconstructing their damaged tubes.

But were the worms using chemical or visual signals, or neither, in choosing their sequins? Like many polychaetes, diopatra have "eyes" that don't form an image but are sensitive to varying intensities and wavelengths of light. Different colors of sequins reflect different amounts and qualities of light, and there existed the theoretical possibility that my worms might pick up sequins on the basis of visual cues, rather than because they were "clean" or "dirty." If I wanted the experiment to be accurate, I would first have to test to see if diopatra showed any sort of visual preference for different colors of sequins, as opposed to a selection based on chemical cues they would pick up from them. I had to give my worms all five sequin colors from the Woolworth's variety pack. And, to insure absolute statistical accuracy, I had to present a worm with the same number of each color.

I decided to use only Midas, Cleo and Di for that test. I counted out 20 of each color of sequin and examined each one to make sure no two were stuck together (which would throw off the statistical accuracy of whatever result I got). I combined the sequins and "randomized" them by swirling them in water. Then I dumped them on a waiting worm.

After three days, the sequined tube caps were more than an inch long—big enough to harvest. After vacuuming up excess sequins with a siphon, I carefully sliced off each tube cap just below the new construction, hoping that the worm below had the instinct to keep its tentacles clear of my scalpel. The curved, hollow cylinders looked a bit like metallic, particolored pinecones.

To attach one of the shiny disks, a worm would first stretch out of its tube and nab it. After retracting at lightning speed, it "glued" the sequin to the tube opening. Sequins placed earlier overlapped those stuck on at a later time. *And*, most of the sequins had been placed concave side down, so they overlapped like fish scales—by itself an amazing feat. If a worm were adding sequins at random, then roughly half should be concave side up. In these and subsequent tube caps nearly all of the sequins were set concave side down. There certainly wasn't randomness here.

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The road not taken.

I always wanted to cross the Sahara, and the Gobi, by foot. But I didn't. I did not swim the Hellespont. Didn't ascend Mont Blanc. Didn't read all the books I had to read. Ached to fly a Ford tri-motor anywhere, even to St. Louis, but didn't. Did not modestly decline the Nobel Prize. Didn't spend even one night at Shepheard's Hotel in Cairo. Not one.

Shepheard's burned to the ground before I could afford to check in. That night, it became my code word for everything unobtainable, undone.

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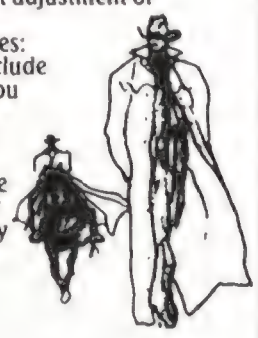

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What about randomness in sequin color? Caps made by Midas and Di indicated that everything was on track to run the experiment originally planned. Both had used all five sequin colors, which seemed to be placed randomly. But not on Cleo's cap. There, spiraling up the cylinder, were eight green sequins all overlapping, or nearly so, in a rough line. Next to them, on either side, were several overlapping red disks. In addition, Cleo had used nearly twice as many red and green sequins as blue, silver and gold ones.

I was certain that Cleo's tube represented anything but random selection. All plans for the dirty-versus-clean-sequin experiment were put on hold. Everything would be geared toward determining whether diopatra had a visual preference. I wanted to have definitive proof of my incredible discovery by summer's end, and I even dreamed of how the newspaper headlines would read: "Seaworms Rival Liberace in their Sequined Splendor—Study Shows they Prefer Red and Green."

As there were only three weeks left in the marine ecology course, I had to work fast. To be statistically accurate in proving my case, I would need as many tube caps as possible. I dug up four more worms, and put all 11 to work producing sequined tubes.

Shortly thereafter, I began running into glitches. The tube caps produced after Cleo's precedent did not seem to show the same strong trend, although I thought I could discern some patterns. To prove this, however, I had to come up with statistical methods for analyzing them. The analysis would require lumping several probability problems together and solving them all at once. For each sequin, there was the probability that the worm would pick that color, the probability that it would place it where it did, the probability that that sequin would overlap one of the same color, the probability that. . .

At the same time, I decided that my worms needed more sequins. Instead of giving one 20 of each color I would give it 50 of each, to make 250 in all. With 11 diopatra producing caps, I had to hand sort and count 2,750 sequins for each experimental run. A worm could produce a full-size cap in three days, and since each experimental run should be the same length to be consistent, I had to sort sequins during every free moment. I took them to class lectures, I counted them during seminars, I even sorted (under cover of dim light and a large auditorium) during talks by distinguished scientists. Still it was difficult to keep up with the worms, for in addition to counting sequins I had to process the tube caps: slit them down the side, carefully flatten them, weight them down, let them dry, then preserve them with acrylic spray. After that, I had to draw an enlarged map of each cap and the configuration of its sequins, so when I did find a statistical method I could start taking data.

My quest for a statistical method was not going well, however. I queried instructors, talked to other scientists, searched the literature, all to no avail. In the end, it appeared there was only one way left to get an idea, albeit a nonstatistical one, of whether the worms used any sort of visual cues in selecting sequins: have them work in absolute darkness. By comparing tube caps made in no light with those built under normal day-night conditions, I could at least see any differences between the two that probably resulted from visual cues. As there were just a few days left in the course, I would be able to make only one experimental run.

I made cozies from thick black plastic, prepared the tanks in the usual way, dumped some sequins in and covered the aquariums. Two days later I was out of time and had to unveil whatever my diopatra had built. There were glorious tube caps, longer than any two-day caps I had seen before. But they appeared no different from the others. Without any statistical methods to apply, however, there was no way to confirm this. So much for my Nobel Prize.

The next day, the course ended. Then came time for the event I dreaded—striking the aquariums and releasing the worms. At sundown, three of us took the diopatra back to the ocean and waded into chest-deep water to where other diopatra lived. My friend the journalist served as the official diopatra-release photographer, and my best friend (who had come for a visit) got roped into being the official bearer. As he sang heartfelt chorus after chorus of "Born Free" (emphasizing the "you're free as the roaring tide" part), I buried each worm in the sand. Midas, always my favorite, was the last to be settled in. We gave a silent salute and waded slowly back to shore.

W. Eric Keller

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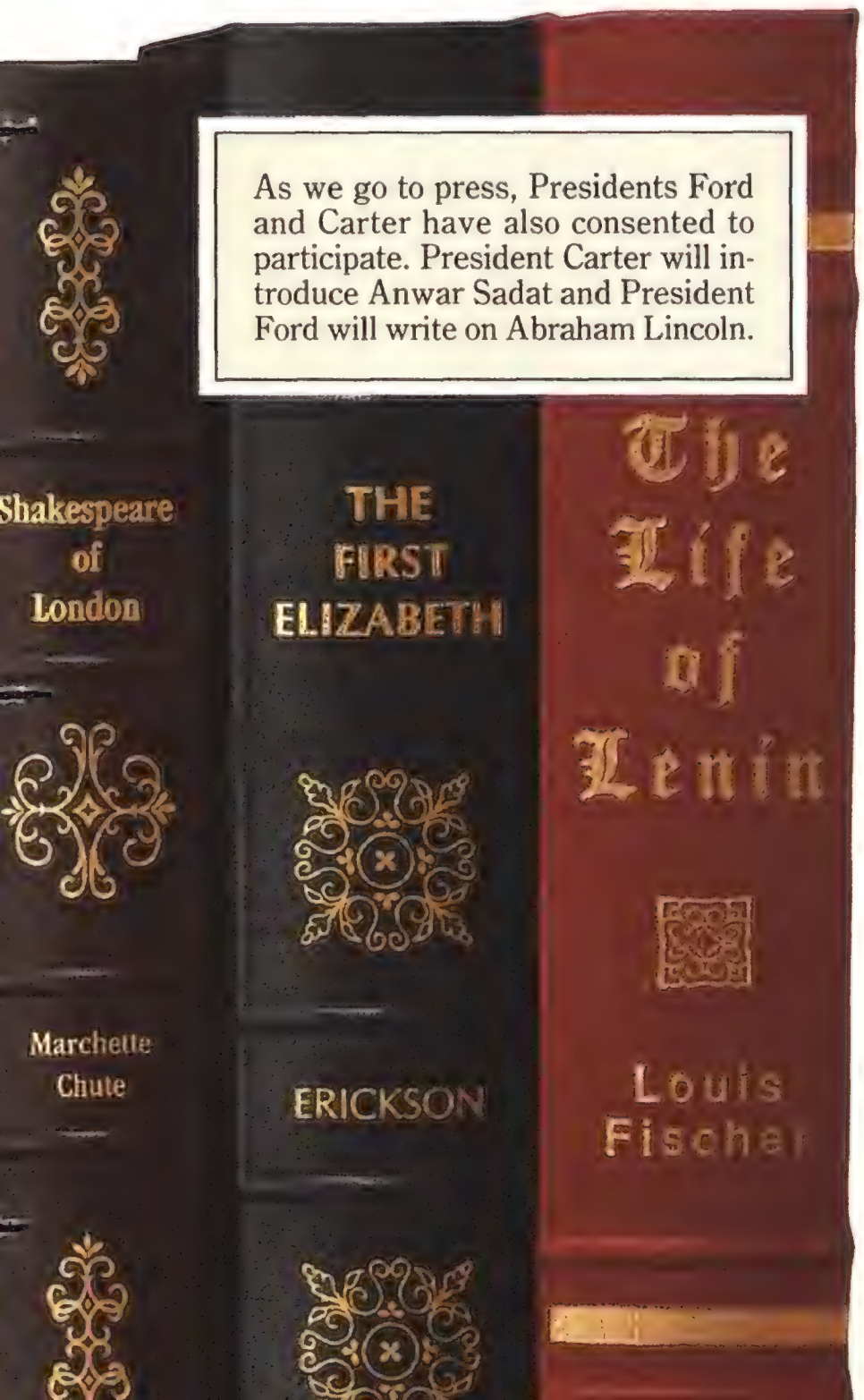

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By Richard Conniff

'Any business that has to do with food, you got to keep rolling'

For shoppers, workers and managers at this computerized suburban store, perpetual motion is the name of the supermarket game

At 7 o'clock on a Friday evening, cashier supervisor Teddy McCants is all over the front end of store 180, the Giant Food supermarket in Baileys Crossroads, Virginia. He has 18 checkout lanes open, and the terminals are clicking and pinging like an amusement arcade. It is a little quiet still for McCants, who is trying to balance customer movement against two full clipboards of on-duty employees. "James," he says, "I want you to bag on 13. Debbie, Al, go home. Two dead," he calls to the office staff, pushing the cashiers' pans back through a mail slot. "Countdown on those two pans. Brigette, take a break. See you in 15."

He is a short, powerfully built man, with his head shaved in a reverse tonsure, hair only on top, and a yellow No. 3 pencil at a jaunty angle behind his right ear. He walks with a purposeful bounce. You can tell he is an ex-Marine by the cadence of his sentences: "Put-that-bow-tie-on, young *man*."

It is the start of a busy June weekend, and while many of this country's supermarkets will be doing big box office, few will do as big as store 180, which is located in the middle of an affluent, densely populated area outside Washington, D.C. In these three days, it will sell $582,800 worth of merchandise, from neckbones to truffles, from White Castle Microwaveable Hamburgers to Wolfgang Puck's Original Pizza California. On Saturday alone, the customers will clean out Aisle 17 (altogether there are 22 aisles in the store) and the crew will have to bring in ten pallets of paper products to restock it for Sunday.

There probably isn't any better symbol of America's abundance than the supermarket, which has been part of the national scene since 1930. In that year, a store called King Kullen opened in a vacant garage in New York City, advertising itself as the "world's greatest price wrecker." Imitators soon followed, and today we have 30,400 supermarkets. Giant's store 180, which opened in 1986, is among the most abundantly supplied, and it is a model of what it takes to produce the daily all-American extravaganza of perishable merchandise. Amber waves of grain? That'd be Aisle 5, ma'am. Fruited plains? You can find 'em in Produce or in Aisle 3, canned goods.

Everything about 180 is big. It uses 60,000 twist ties a week. It recycles 6,000 pounds of scrap cardboard a day. Last year it took in more than $53 million, making it the top supermarket in the Washington metropolitan area. When the Soviet agriculture czar was in town, his hosts chose store 180 to play out that scene so dear to capitalist hearts, the comrade-in-grocery-wonderland.

While some shoppers at Giant Food store in Baileys Crossroads, Virginia, examine produce, others hurry by.

Photographs by Cameron Davidson

How one supermarket does its thing

Ex-marine Teddy McCants barks orders at the front of store 180, where he supervises cashiers, clerks.

Manager John Zepp, who runs a tight ship, reviews work schedules in office with assistant Paula Hoffman.

(The comrade, a spoilsport, wondered who could afford the high prices and how farmers fit in.) Store 180 isn't merely well stocked, it is also part of a regional supermarket chain with the often-stated policy of making big money by paying attention to the little things. Customers, for instance.

A call for assistance comes from Beer and Wine, and McCants lopes off, yelling, "Look alive, Freddy!" to an idle bagger. (It is a hopeless suggestion. McCants makes everyone else look lumpish.) A young customer wants a case of wine for his sister's wedding-rehearsal dinner. McCants asks some judicious questions about ages and tastes, then suggests a mix—fine wine for the parents and something a little less costly for the younger crowd. "We got 'em spoiled," he says, heading up front again. "But you look at the profits this store's done, you want to spoil 'em. You want to keep 'em coming back." It is this supermarket's credo.

Zepp cuts a good bottom line

Weekends are the easiest part of the job, according to John Zepp, who is manager of 180 and McCants' boss. Getting ready for them is what takes work. He has been at it all week. Zepp, who comes from West Virginia, says he is "strictly a hillbilly." But he is also a company man, having started with Giant as a cashier 28 years ago. He is known as a tough manager who spends most of his time roaming the floor, not in the office. In his first year at 180, his tinkering with schedules has reduced payroll from 16 percent of sales to 11.2 percent. He is a detail man. Employees ride him for having taken the 55-gallon garbage bags out of the supply room and up to the front office, but Zepp says it saves $6,700 a year in plastic alone. Nobody requests a bag now unless he really needs it for trash. His admirers say Zepp cuts a good bottom line.

Monday morning at 8:30, he is in the deli aisle, picking through the scrapple, a slow-moving item, to see that his clerks are watching the rotation—older packages up front, newer ones in the rear. He checks for signs of mold around the burn spots on some packaged burritos, and for milkiness in the bologna. He is a stickler for full shelves, with no wire-cage "dummies" stuck behind to "front" the merchandise. "Holes" on the shelf, items that are out of stock, are anathema. One of Giant's guiding principles (which are ample enough to fill 27 three-ring binders in Zepp's office) is that an out-of-stock item can send five customers to another store. Unspeakable thought. If Zepp can't get an item, he will sometimes shop for it himself at a Safeway, Giant's archenemy in the Washington area, and pass it on to the customer at cost.

Even on Monday morning, the shelves at store 180 are not shot full of holes. A computer calculated the

A future shopper relaxes in the cart seat while her brother rides shotgun and mother provides the power.

Store 180 maintains a fleet of some 350 shopping carts (450 during holidays), replacing about 50 a year.

past weekend's sales and ordered up a trailerful of merchandise to replenish the store on Sunday night. Managers in the store's ten departments are also working the aisles now, noting deficiencies and penciling in their orders. Up front at Checkout Lane 8, a cashier is typing the first of the day's orders into the computer, which will transmit them to headquarters in Landover, Maryland. She keys in little bursts of data, clickety-clickety-click, and the computer understands that "5 of 1 on 101" means five cases of Orchard Kiss Orange Juice for delivery from Giant's warehouse in Jessup, Maryland, by 11 tonight.

Zepp has worked his way to Aisle 7 when a customer comes up to complain that some baguettes he bought from the in-store bakery got stale on the second day. Why not sell a half-loaf, too? Zepp drops everything (another company policy) and leads him to the bread counter, where half-baguettes baked that morning are selling for 59 cents apiece. At store 180, the volume is high enough and the clientele sufficiently diverse to justify almost any product, in any size. Says a Giant executive: "You could put canned horse manure in there and somebody'd buy it." This is a slight exaggeration but cow manure in 40-pound bags does sell nicely.

Up in Landover, there are people who do nothing but think about what products customers might buy, and how to market them. The headquarters of Giant Food Inc. is a shabby place, with worn carpets in the halls, and the back-office people are proud of it: "We spend our money on the stores." Here buyers and merchandisers for the chain pick skeptically through myriad product possibilities.

The competition for space on a good shelf is like trying to gain admittance to Yale Law School. To get an item "cut in," sales reps attack with advertising, discounts, deals (buy 1,000 cases and get 10 free), promotions and sometimes subterfuge. At Giant, they must sell to an impersonal committee. Individual store managers do not make any merchandising decisions; they merely follow the orders in a daily bulletin that can run to 70 pages. Even so, everybody from department managers on up must sign statements that they have not accepted manufacturers' premiums, bonuses, payola.

Bob Bennett sits at a battered metal desk in a windowless office in Landover, with the blueprints for a new store on the wall. It's his job to figure out where

Inspector Danny Downs checks cartons of apples at Giant's produce warehouse in Landover, Maryland.

Ordermatic goes "shopping" for canned goods and dry groceries at another facility in Jessup, Maryland.

to put an item on the shelf. All 146 Giant stores are laid out on the same plan, with the minimum necessary variation, so no decision comes lightly. Every manager puts garlic presses next to fresh garlic and tomato slicers with tomatoes; most customers would skip an aisle devoted entirely to such impulse items. Every manager also puts Giant-label peanut butter ($2.09 for the 18-ounce jar) between Jif and Skippy (both $2.24), to make the price break more obvious. Giant manufactures many of its own store-label products, and you can tell by the shelf position that they are a key to the chain's strength. It makes a 40-percent gross profit on its own peanut butter, for instance, versus only 18.5 percent for Jif. "We haven't put any national brands out of business yet," says Bennett. The bigger profit margin on Giant's own products *has* helped put competing supermarkets out of business. In 1986, when Safeway needed cash in a takeover battle, Giant was

Filling orders from local stores, computerized system collects cartons in six sections of warehouse at once.

A "do not use" sign identifies strawberries that failed their first inspection and must undergo a second.

able to launch a brutal price war. The Safeway store directly opposite store 180 shut down soon after.

Though decisions about where to put an item on the shelf usually follow some readily apparent logic, there are exceptions. Nabisco, for instance, has a special promotional arrangement with Giant for a three-shelf "cut out" in Aisle 7 to display Fig Newtons in the middle of pickles and jelly. The reason is that the stuff sells there. Any manufacturer can work out a similar deal to test the effect of such a position. The scanner system at the checkout counters helps Giant to look at a product and compare sales from a group of test stores with those from a group of controls; it sells the resulting data to the manufacturer. For Bob Bennett's purposes, the computer also automatically tracks the slowest-moving items each week. If squeezable plastic makes ketchup in glass bottles unpopular, Bennett promptly cuts back on glass, chain-wide. "You can basically tell what sells in a store by how much space it has," he says. "We don't put it there to take up room."

Connecticut writer Richard Conniff remembers when the grocery in his hometown had sawdust on the floor and gave free pretzels to youngsters.

The hard-nosed logic of this sometimes frustrates manufacturers. Salesmen are not above sneaking into a store and rearranging a shelf to give their product better "facing." This displeases Giant. "We'll cut your arms off," says Bennett. The department managers at store 180 have caught liquor salesmen working over the beer case. Hapless salesmen have offered them free shirts, free dishwashing powder, anything to make a friend. The aisles are littered with arms.

Out in the produce warehouse at Landover, in a windowless room fit for a bookmaking operation, four buyers are taking calls from produce brokers around the country and matching the proffered merchandise to the chain's anticipated needs for the weekend. They are backing off from California apricots, which have been coming in scarred, and looking for peaches grown with irrigation (they may be mealy otherwise). The buyers do not go out in the field to smell the coffee beans; Giant has no Juan Valdez.

It does, however, have inspector Danny Downs, who spends his days in the refrigerated receiving area poking thermometers into heads of cabbage the buyers have ordered and examining lettuce for russeting, freeze damage and water-soaked leaves. He opens a pint of blueberries that have just been trucked in from North Carolina and spills them into his hand. "Nothing but the best," the driver says. Downs has him break

down a pallet to get at the blueberries in the middle, where heat damage is likely to occur. "Everywhere I've been with these blueberries, everybody likes 'em," says the driver. Downs inspects a half-dozen pints, then carefully repackages them. "I like 'em. Very pretty," he says, and slaps a "Good To Go" label on the pallet.

"Attitude means nothing to me," he comments afterward. "Whatever's in the box, that's what does it. Sure, you're in the middle. The buyer works and computes and figures. You got the driver on the other side, driving maybe four days, sweaty, dirty, catching six hours of sleep when he can. Then here comes the inspector and says 'Your apples aren't right,' and you throw the whole system out of kilter."

Tuesday afternoon at store 180. John Zepp has just come out of Produce, where he has been picking bruised fruit out of the nectarine display, when he notices a stylish woman with a shopping cart. "That's one of our spot-checkers," he says. "We're not supposed to know who they are, but if you've been around long enough . . ." She's here to check a new cashier, and her cart is full of calculated trouble: two pounds of white potatoes at 89 cents to see if the cashier will distinguish them from baking potatoes at 99 cents, a nest of aluminum pans to see if he will mistake them for a single item, a selection of look-alike cat foods at slightly different prices to see if he will scan each item as required or merely scan one and then multiply. Elsewhere in the store, she has two underage assistants trying to buy alcoholic beverages without proper proof.

A cashier's life is not strawberries and cream. The starting pay is $5.75 an hour, and if the assistant store manager is anticipating customer movement accurately, a cashier's only slow time is a 15-minute break. At store 180, the front desk keeps track of breaks with an egg timer. "Any business that has to do with food," says one worker, "you got to keep rolling." *Bing*, says the egg timer, and back to work they roll.

Keeping an eye on the cash registers

A cashier may take in $5,000 during eight hours, and the rule is that the cash in the pan has to be within $2 over or under the amount on the register tape. In the previous week, when store 180 had $1.1 million in sales, all of the cashiers together were off by only $12.52. To guard against theft from the registers, security people use the store's computer system. The checkout scanners register, among other things, what product is being purchased. The computer provides a summary of each cashier's daily transactions, including store-coupon averages. A cashier with unusually high coupon averages will likely be monitored more closely. Stuffing coupons into the register pan and taking cash out enabled a cashier at another store to steal $1,200 before

In seafood department at store 180, Derrick Watson weighs fresh fish under a customer's watchful eye.

Clerk Danny Jessee restocks papayas in Produce, which also displays mangoes, tamarillos, jicamas, kiwi fruit.

Butcher Gray Mahoney hangs meat prior to display in store. Beef on "high-boy" (right) is for hamburger.

Shamin Choudhary arranges freshly made items in the prepared foods section and Liz Greiner helps out.

Guy Blanchard, a bagger and courtesy clerk, returns to the shelves unsold items left at checkout lanes.

Performing a noisy ritual familiar to supermarket shoppers everywhere, James Oteng "parks" empty carts.

she was caught. John Zepp can use a computer in the office to monitor what's being rung up versus what he sees actually going into the grocery bags. Sometimes a cashier will help out a friend by moving expensive items *around* the scanner rather than *over* it, a ruse known as "sweethearting."

Giant is also attentive to dishonest customers, and at store 180 two deli clerks have become known as Starsky and Hutch for their exploits against shoplifters. For them, a carton of Kools in the possession of a suspicious-looking character can be cause for concern, because some mentholated cigarettes are easy to resell on the street. Also worrisome can be a box of Pampers: shoplifters like to remove the diapers and replace them with high-ticket merchandise. Thieves also like to line a cart with boxes and fill the "Grand Canyon" in the middle with canned crabmeat at $17.99 a pound, to be transferred to a handbag or a "booster coat" in a dead aisle. Some shoplifters come in with a list to restock the mom-and-pop store that hired them. Others, moved by whim, try to walk out with caviar or imported ham.

The cashier receives a failing grade

In Lane 6, the spot-checker has paid her bill and is getting ready to leave. The new cashier has made good eye contact and said thank you. He has scanned each item, including the cat food and the nested aluminum pans. But he has overcharged on potatoes, undercharged on candy and completely missed a roll of gift wrapping under the cart. Worse, he neglected to say hello. Outside in her car, the checker adds up the items on her performance review and gives the cashier a failing grade: remedial training required. Her two assistants, on the other hand, have been properly carded and sent out ignominiously, minus alcohol.

Thursday at 4 A.M., the only customer is a young man in a leather jacket with metal-spike epaulets, buying a box of Cap'n Crunch Peanut Butter Crunch cereal—and paying for it. The aisles are lined with carts from the warehouse, and the night stockers are "throwing" cases, putting merchandise in its carefully allocated shelf position, at a prodigious rate.

Half the crew is upstairs in the office, being treated to soda, doughnuts and a pep talk about the Giant way of life: "People Who Care." It is an uphill battle for Marvin Faine, a 21-year Giant "associate" (the company disdains the word "employee") in a beige sport coat, gold-rimmed glasses and a full head of brown hair. Faine is Giant's grocery products supervisor in this area. He stands next to a flip chart on which he has outlined important ideas: "A friendly first impression . . . Quick and efficient service . . . Polite and courteous." The night stockers no doubt exemplify all these traits, but they are night stockers partly, at least, because

Store 180 glows like a Las Vegas casino as cars come and go at dusk. Market stays open 24 hours a day.

they appreciate not having many supervisors on that shift. Faine forges on, undaunted when one of them dozes or another works on a hangnail with the razor tip of her case-cutting knife. He believes in the Giant philosophy. He believes that the company has been able to expand at a marvelous rate, that its stock has split and split again, that it has overcome Safeway and gained a 47-percent share of the Washington-area grocery dollar—precisely because it cares. "We have company every day," he tells them, "and the company is the customer who comes in and walks down the aisles. You have to think, 'This is my living room. It's clean. It's ready for anybody. It's well organized.' "

When he's done, two hours later, the sun has risen and the bakery crew has already pulled 12 dozen ring doughnuts, 6 dozen cakes, 10 dozen shell doughnuts, a dozen bismarcks and 2 dozen French crullers from the rotating ovens. Reva Taylor, a clerk, is advising the head baker about special cake orders, including one with "Irreplaceable" spelled out in strawberries.

"Are you on drugs?" the head baker inquires.

Reva laughs. "Hey, I didn't give her a price."

Another customer has rejected a cake because the design is boring and the color red is "ooky." "So I guess she wants me to do it over," says the baker, his artistic sensibilities undented. "What time does she want to pick it up?" He is used to this sort of thing. Ooky reds are nothing. Whatever the customer wants.

Over in Prepared Foods, meanwhile, Chef Richard Hirabayashi's crew is fixing more than 60 dishes for two-career customers who want most of all not to cook. Like many other supermarkets, store 180 is competing not just against other supermarkets but against McDonald's, as well. It has a mile-long salad bar. Its chefs serve up Texas caviar, lemon oregano chicken, feuilletés filled with creamed spinach, ham, cheese. The most popular item? Chicken salad.

Thursday at 3 P.M., in Jessup, a train of empty carts roars through Giant's warehouse with a clatter rivaling a New York City subway. Forklifts and golf carts race around the aisles, full of purpose. This warehouse is like a city. It is a quarter-mile to the far wall, and under the overhead lights the cases of merchandise stacked 28 feet high are hazy skyscrapers of brown cardboard. Almost 150 truckloads have come in from suppliers this morning. Every case has been logged into the computer, tagged and delivered to its assigned location in the storage racks. Now, in the center of the warehouse, a big blue monster called the Ordermatic is thrumming with life, filling the orders keyed in from supermarkets this morning.

Computers run the show. They take the store orders from Landover and queue them up in proper loading sequence. They assign warehouse workers to pick out some items from each order manually, because they are low-volume or odd-sized. They control the Ordermatic, which can send 7,200 cases an hour to the proper loading bays for delivery.

The Ordermatic looks like two sets of grandstands facing each other across a narrow aisle, or like the insides of a vending machine the size of a football field. It consists of 5,400 gravity-flow lanes, stacked 10-high. When the computer calls for an item, it drops out of its lane onto a conveyor, like an egg from a chicken cage.

The Ordermatic keeps food moving

A crew keeps the lanes replenished from behind, retrieving pallets of merchandise from the storage racks according to the computer's analysis of what the Ordermatic will be needing 45 minutes from now. All along the line, release gates are clicking open. *Click, whack!*—down comes a case of Original Sloppy Joe Sauce. *Click, whack!*—and there goes a case of Tuna Helper Tuna Pot Pie, squeaking off across the metal rollers, up through a roller coaster of conveyors curved around the glass-enclosed computer center and off to its destiny: store 180, which tonight will receive 22 pallets—one full trailer—from this warehouse, another from the frozen-food warehouse across the way and another from Landover. The weekend begins tomorrow.

Thursday night, store 180 also receives an unannounced visit from a zone manager, the third Giant supervisor to drop in this week, all of them nitpickers. This one has found two shelf labels missing in Ice Cream, a dearth of whole roasters in Poultry, and an unappealing display of produce. He wants the plum tomato box cut down farther so you see less cardboard

and more tomatoes. He believes the gourmet produce section, which already includes tamarillos, jicamas and hydroponic cucumbers, needs more variety.

"It's what keeps you on your toes," says John Zepp, a little chagrined to begin Friday morning with news of the unsatisfactory review. But he is accustomed to visitors, from Giant and elsewhere. Last week, delegations from Finland, England, China and Japan trooped through, most of them filled with awe and admiration. "If I could get these people to buy when they come in," he reflects, "I could really make some bucks." Then he rushes off to reorganize mangoes and pick Bing cherries out of the kiwi fruit, and to get the rest of the store up on its toes.

Out back, delivery trucks are lined up, and the vendors are wheeling in handcarts of bread, soda, beer and junk food. The receiver checks each order, going so far as to count the loaves in a stack of bread 12 trays deep. In Produce, the blueberries from North Carolina are going up as an end display. In Aisle 3, Zepp is worrying the grocery department manager about the Kool-Aid shelf, which is not flush enough for the start of summer, and about a hole in the packaged nuts section.

Toward noon, traffic at the front door builds, and the checkout terminals begin to click and ping. More than 7,000 customers will buy their groceries here today, 8,900 on Saturday. There will be immigrants from Slovakia, Somalian women in headwraps and colorful cotton *derahs*, members of the Washington diplomatic community, government retirees. A score or more of them will collar Zepp to locate merchandise, resolve complaints, even change a flat tire. "I saw on the front page of the business section that this store was doing $53 million," one of them will begin. "Number one in the Washington area, for which I congratulate you." She pauses. "Since this is such a great store, tell me—why can I never find a rib steak?" Zepp will get a butcher to cut up a side of beef for her. "This doesn't ever go on sale?" she inquires, selecting the smallest steak.

In the poultry section, a husband will admonish his wife: "You can't just stand there. It's like the freeway. You've got to keep moving."

That's the nature of the supermarket business. On Sunday, the night stockers will replenish the store. Then it will start all over again at 7 o'clock Monday morning, with scrapple rotation in Aisle 1.

Truck hauls a load of goods from Giant's warehouse in Jessup on way to local store. Modern communication and transportation have made bountifully supplied supermarkets a vivid symbol of America's abundance.

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Using devices that slide up a rope but not down, Rick Bridges climbs 150-foot shaft on way out of cave.

He is one of three leaders directing the survey of Lechuguilla, second-deepest cave in the United States.

By David Roberts

Caving comes into its golden age: a New Mexico marvel

Borrowing the tools of mountain climbers, a hard-core band of cavers is pushing to new depths to discover underground wonders

During my ninth hour underground, as I scrambled up a slanting tunnel through the powdered gypsum, Rick Bridges turned to me and said, "You know, this whole area was just discovered Tuesday."

Slow-brained with fatigue, I mumbled an acknowledgment. It was only later, as I kneaded my aching thighs during a rest stop, that Bridges' remark struck home. My God, I thought, how often does anyone have such an experience? In an age when every square foot of the Earth's surface has been mapped and photographed, how incredible to walk through a place no one knew existed before last Tuesday!

I was 1,000 feet deep inside Lechuguilla Cave in southern New Mexico, a neophyte privileged to join some of America's best cavers as they explored the most exciting underground labyrinth currently being "pushed" anywhere in the United States. I felt dog-tired, apprehensive, ready to turn around and head for the entrance—yet caught up in the drama of pioneering.

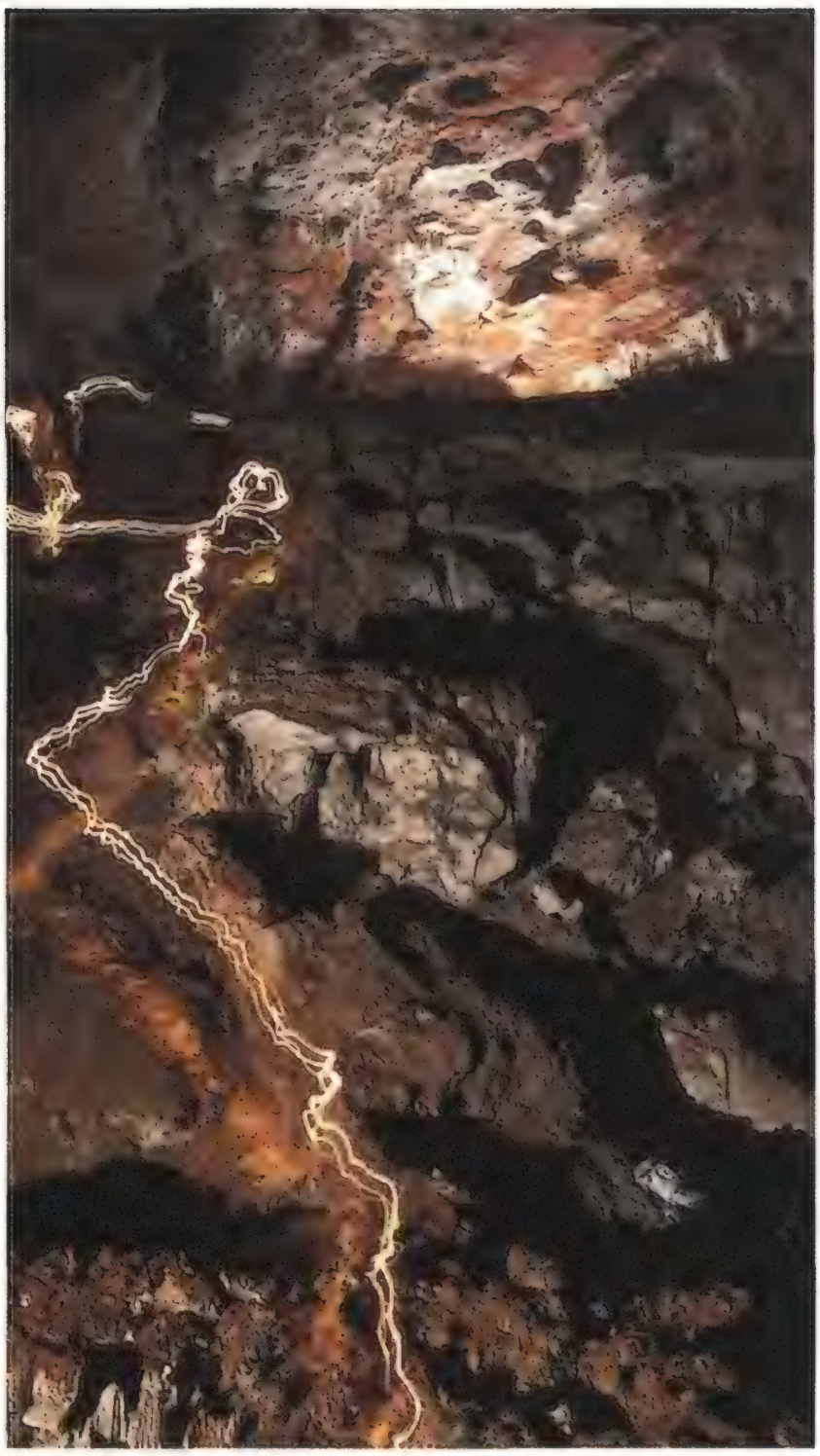
Caving in this country remains an unappreciated, misunderstood sport. On the eve of my trip to Lechuguilla I told a number of friends, some of them avid

Silhouetted explorers give scale to the Prickly Ice Cube Room, one of the cave's largest openings. Chamber is named for the highly eroded gypsum boulders on the floor: they have razor-sharp edges.

Photographs by Michael Nichols

Caving comes into its golden age

With a team, Cyndi Walck surveys the Red Lake Room, a water-filled chamber they had just found.



In this time exposure, cavers' lights mark the trail up Glacier Bay. They must follow established paths.

outdoorsmen, what I was about to do. At best, they feigned interest; several could not suppress a shuddering repugnance for a sport that seemed to them little more than crawling through mud in the dark.

The National Speleological Society has recently grown to an all-time high of more than 7,500 members. According to Rick Bridges, however, there are only one thousand to two thousand "hard-core" cavers in this country. Yet caving worldwide is now in its golden age, an era of limitless discovery and innovation analogous to the 1950s in Himalayan mountaineering, when all the highest peaks in the world, from Annapurna to Everest to K2, were conquered.

Lechuguilla Cave lies only a few miles from Carlsbad Cavern, still within Carlsbad national park. Lechuguilla Cave has been known since at least 1914, when three locals mined it for bat guano, which they sold as fertilizer. The entrance to Carlsbad Cavern is a huge amphitheater set in a natural hollow. Lechuguilla, however, begins with a narrow, dirty shaft set in a drab

Thin, vertical objects in foreground are called "soda straws"; they are extremely fragile, hollow stalactites.

A caver catches a nap in the Emperor's Throne Room 1,000 feet down. Average trip time is now 24 hours.

hillside swathed in cacti, yucca and the lechuguilla plant—an agave whose sharp spines are the bane of the unwary hiker. Below the 90-foot entrance shaft, early visitors found a humdrum passage that shot off at an angle, then ended in a pile of fallen rock rubble. As late as 1971 a park naturalist concluded that the "cave is very small and somewhat disappointing."

What serious cavers live for, however, is "virgin passage," and a single fact kept bringing them back to Lechuguilla: air was continually blowing through the rubble. At other sites, such a breeze had been a reliable harbinger of a big cave below. From the 1970s on, a series of teams plied the rock pile in hard-work, no-glory digging expeditions. They had no guarantee of success—the dirt and debris could end in intransigent (if porous) bedrock, and since there were several different spots where the wind blew hard, the diggers could be working in entirely the wrong place.

On May 25, 1986, however, a trio of grubbers made the breakthrough. Rick Bridges, my guide in Lechuguilla, was one of them. The team pushed onward, finding spectacular rooms and passages, and came to a frightening vertical shaft that was clearly deep. There followed a yearlong hiatus while National Park Service officials pondered how to manage the exploration of what had quickly become the "hottest cave in the country." Only in July 1987—a mere nine months before my visit—did the serious passage-pushing begin.

I'm an experienced mountaineer, but before Lechuguilla I had ventured only into the more accessible parts of just a handful of caverns, and I had done no technical caving. One of my fears was of being "sandbagged"—dragged in over my head by seemingly nonchalant veterans who thereby let you know how tough their sport is. Over the phone Bridges had said, "Since it's your first time, we'll do a short trip, maybe

David Roberts writes about both the outdoors and literature; his latest book, Jean Stafford: A Biography, *was just published by Little, Brown.*

12 to 16 hours." I allowed as how maybe 10 to 12, or even 8 or 6 hours should be plenty for me. Bridges didn't seem to hear.

My guide turned out to be a stocky, bearded 35-year-old from Boulder, Colorado. A manic energy issuing in nonstop conversation is one of Bridges' stamps. He earns his living from oil exploration work but, like most of his underground colleagues, breathes, eats and sleeps only to get through the boring periods between cave trips.

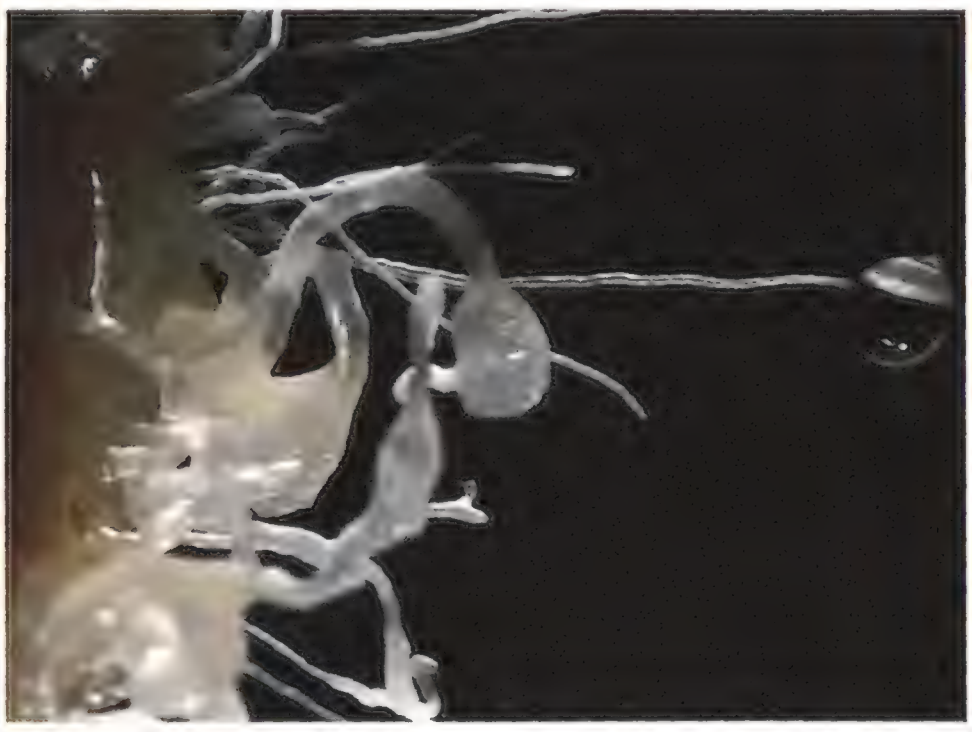
With two young men named Scott Adams and Randy Brooks—good, solid cavers, but not in Bridges' class—my guide and I formed a four-man team. Since Scott and Randy were gung ho to see some of the deeper wonders of Lechuguilla, I sensed the sandbag swaying overhead even as we approached the entrance.

Thanks to Bridges' continuous narration, our nine-hour trip into the side passage above Manifest Destiny—the part of Lechuguilla that had been discovered only Tuesday—served as a vivid firsthand résumé of the exploratory history of the cave. Less than an hour in, we came to Boulder Falls, in a sense the "crux" of the whole cave. It is a 150-foot vertical shaft named for the tendency of cavers to dislodge large chunks of rock and send them bouncing into the void. Potentially it is a dangerous place.

As a climber, I was not perturbed at rappelling into the pit, even though for 70 feet one pirouettes in space, touching no walls. It was the climb up the rope on the way out that worried me. On rock climbs, I had "jumared," shinnying up ropes with the aid of a pair of mechanical devices that slide upward along a cord but grip it under a downward pull. On anything like vertical terrain, however, jumaring with a pack is exhausting. Bridges assured me he had a better system, but the last thing I wanted to do was to hit Boulder Falls on the way out and find myself too tired to haul myself up the long, fixed rope.

As we passed each quaintly named territory on my way into the bowels of Lechuguilla, I had an inkling of the effort it had taken to get there the first time, and to survey and mark the place. The names thus com-

Dave Modisette admires enormous, frozen "sprays" of gypsum radiating as far as 20 feet from the ceiling.



Lechuguilla is rich in what cavers call "decorations." From the left: bladed gypsum crystal about eight inches long; twiglike deposits that are called helictites (note the drop of mineral-laden water on tip, right);

This grouping, which gave rise to the name Chandelier Ballroom, may be the most impressive in the world.

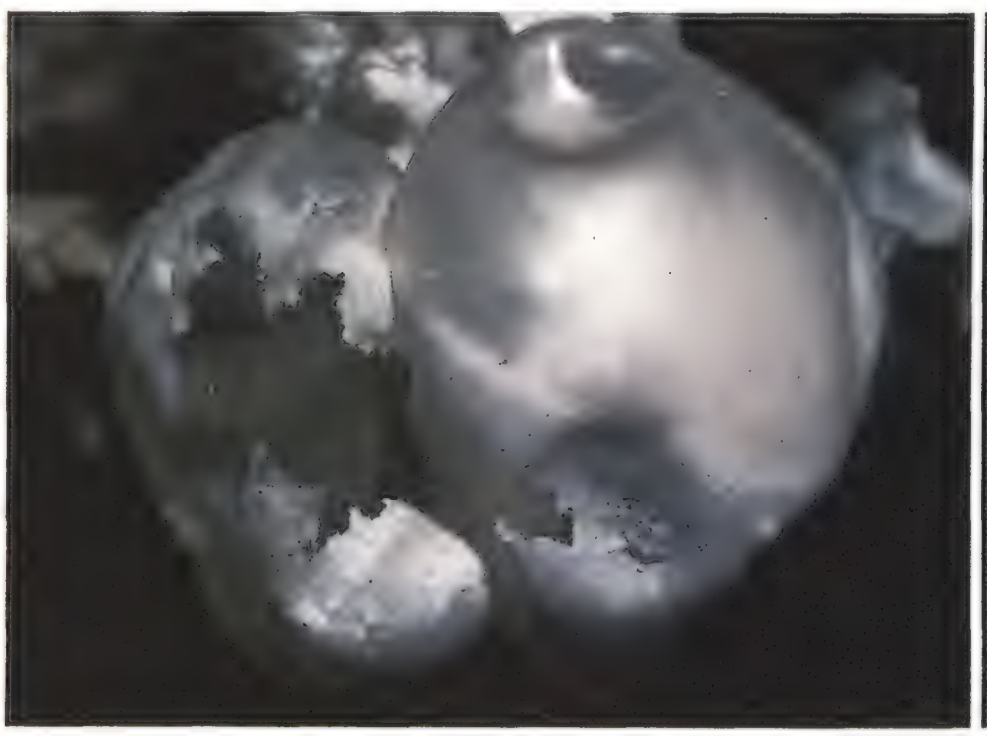
manded respect: Liberty Bell, Boulder Falls, Glacier Bay, Sugarlands, the Great White Way, Deep Secrets, the Fortress of Chaos, the Western Borehole and so on.

At the end of July 1987, Lechuguilla had threatened to peter out in a nasty, narrow fissure called the Rift. The only hope for continuation lay in a 90-foot wall that looked all but unscalable. Cavers are not usually expert rock climbers as well, but in this case two men from Colorado Springs, Art Wiggins and Don Doucette, made a brilliant and risky ascent of what they called Captain Hook's Ladder. It was the key to the puzzle: from the top of the wall, the cave went on and on. On the second trip through, another team discovered the Overpass, a hidden shortcut by which the Lower Rift and Captain Hook's Ladder could be eliminated. Its traversal, however, nearly occasioned Lechuguilla's first fatality. Unroped above a 70-foot drop, expedition coleader Roy Glaser slid gingerly around a huge block of rock that seemed solidly attached to the wall. As he embraced the block with both arms, hands clutching its edges, the whole thing slid a few inches—then stopped. The spot, on which a fixed rope now hangs, is aptly named Freak-Out Traverse.

At a temperature that remains in the upper 60s, Lechuguilla is a warm cave. In higher, wetter or more northerly caves, explorers often wear wet suits. Here the outfit of choice is T-shirt, old jeans and lightweight boots. At Bridges' urging, I also wore knee and elbow pads, and leather gloves. Every caver uses a helmet with headlamp and carries two backup sources of all-important light. In our packs we hauled food, water and technical gear.

At times in Lechuguilla, you could walk comfortably. Much of the going, however, required scrambling, unroped climbing, chimneying, crawling and even slithering. The intensity of the sport lies partly in the fact that you must always be on guard: stable-looking piles of fallen boulders, because they have never been weathered by the elements, are as teetery as pick-up-sticks; that small, dark shadow just beyond your next step may be a shaft plunging to unseen depths.

One of the marvels of the route in Lechuguilla is



cave pearls, pebbles of layered calcite; "gypsum beard," which can be shattered by air currents; hollow balloons formed by expanding gases; and the gypsum flowers that grow along the Yellow Brick Road.

More than 1,200 feet beneath the surface, Dave Modisette works his way into the Nirvana Passage.

how often the whole system narrows to an unlikely hole, through which one barely fits; then the cave expands once more into vast stretches of complex passageways. During the initial explorations, teams pushing the route feared again and again that the whole thing had come to an end. At one such impasse, as a team surveyed the Deep Sea Room convinced it was a dead end, a relatively inexperienced caver named Louise Whitehead started up a steep slope, murmuring, "Where does this go?"

"Nowhere, as far as I know," said the project coleader, turning back to his survey notes.

Whitehead clambered on. A few minutes later, she discovered a stunning chamber full of conical mounds of calcite flakes. White Christmas Tree Room, as it came to be known, was the portal to miles of passage in the Western Borehole, whose termination cavers have still not reached.

Many big caves have drab interior landscapes, but Lechuguilla, like Carlsbad, is exceptionally well "decorated." On our trip in, we passed so many prodigies of slow-forming carbonates that my mind teemed with exotic images. Along with an uncountable variety of stalactites and stalagmites, we saw odd corkscrew helictites; "soda straws" hanging in breathtaking delicacy from the ceiling, one perhaps 18 feet long; gypsum threads, some 15 feet long and nearly invisible, as fine as angel's hair; tiny hydromagnesite balloons, found in only four other caves in the United States; smooth pebbles called cave pearls; generous terraces of gleaming flowstone; shelves of bulbous stuff known as popcorn; bespangled crystal networks, called aragonite bushes, that look like dwarf evergreens shagged with rime; gypsum flowers and chandeliers; and a dozen other exotic mineral formations.

To all but experienced speleophiles, caves tend, I suspect, to be profoundly disturbing places. In Greek myth, mountains are bland, official landscapes, the residence of Zeus and the Muses. The underworld, however, is enigmatic, a domain of longing and terror, the haunt of Charon and Cerberus. During rest stops in Lechuguilla, I tried to analyze the feeling of utter alienness that enveloped me. The darkness is paramount. A standard exercise that old hands like to inflict on subterranean novices is to have everyone sit down and turn off his light. A few always gasp or shriek with the shock of total lightlessness.

The silence, too, is unprecedented and I should think it would be unsettling even for experts to go into caves alone. Nor have most people stood anywhere on Earth where there is a complete lack of living things—the condition of most caves beyond the entrance regions. To operate for hours without a natural horizon—something that almost never occurs above ground—can be dizzying. And marvelous and novel though the formations in caves can seem, they are so unfamiliar that they, too, add to the strangeness. (It is an unconscious defense against this phenomenon, I would guess, that leads commercial cave developers to assign such cutesy, Disneyish names to the features.)

The other overpowering sensation I had as we crept

Here, dripping of mineral-rich water has left close rows of deposits that look like fringed curtains.

deeper into Lechuguilla was of how infinitely complicated the labyrinth is. Without the identifying scraps of red tape and Bridges' knowledge of the place, I would have been lost 20 times. Lechuguilla is unusual in that some 90 percent of its known passageways lie more than halfway down. Below the Rift, where Doucette and Wiggins made their vital climb of Captain Hook's Ladder, the cave branches into three subsystems of chambers and passages, none yet explored to the end.

Manifest Destiny is a large oval chamber about halfway down the Western Borehole. Explorers on their way through had noticed a possible lead high in the ceiling, and only four days before my trip, Steve Davis, a caver from Georgia, had made a bold solo climb up an overhanging ramp to reach the unexplored lead. Then he had tied a rope around a block in the ceiling and dangled it till it reached the floor, establishing a vertical thoroughfare for future pushers of passage.

By the time we came to that rope, which snaked through space six stories up to the arcane regions, I was pretty beat. So were Scott and Randy, but they wanted to see what lay beyond. Rick Bridges' sandbag was subtly delivered. "You want to come up the rope with us," he asked me, "or wait here?"

Bridges' "ropewalker" system consists of one rope-ascending device attached to the right foot; another next to the left knee, with a bungee cord to keep it from drooping; and a roller strapped high on the chest to keep the caver upright. Using more adrenaline than technique, I bashed my way up the free-hanging rope. Soon the procedure started to come to me. To my astonishment, just as Bridges had claimed, you could actually climb a rope in such a rig without using your hands.

The passages that issued from the dark gap in the ceiling were some of the most beautiful in Lechuguilla. We slogged through dry snowdrifts of pure white gypsum; even Bridges had never seen the like. Within an hour we came to the farthest reach of Steve Davis' push the previous Tuesday.

We were in what cavers call boneyard—rock honeycombed with short, twisting passages. The impression is of being inside a gigantic Swiss cheese of stone. Four days before, Davis' team had taken a long rest in a big room here before heading back. Still psyched up by his discovery, Davis announced he was just going to check out one of the many boneyard tunnels. Without even picking up his pack, he popped into the passage. It seemed to curve futilely back on itself, making a semicircular loop. Within minutes, Davis stepped back into the room and muttered, "It doesn't go anywhere."

No one answered him. Confused, Davis looked around. It was not the same room that he had left. He turned back to find the tunnel from which he had emerged. A dozen dark holes mocked him; he had no idea which one he had just come out of.

At first, Davis later confessed, he "lost it," running from hole to hole in a panic. Then he forced himself to sit down and take stock. Meanwhile, his companions, growing worried, had started shouting and looking for him, to no avail. After about two hours of searching, they sent another pair of cavers all the way to the surface to launch a full-scale rescue.

Lost and alone for five and a half hours

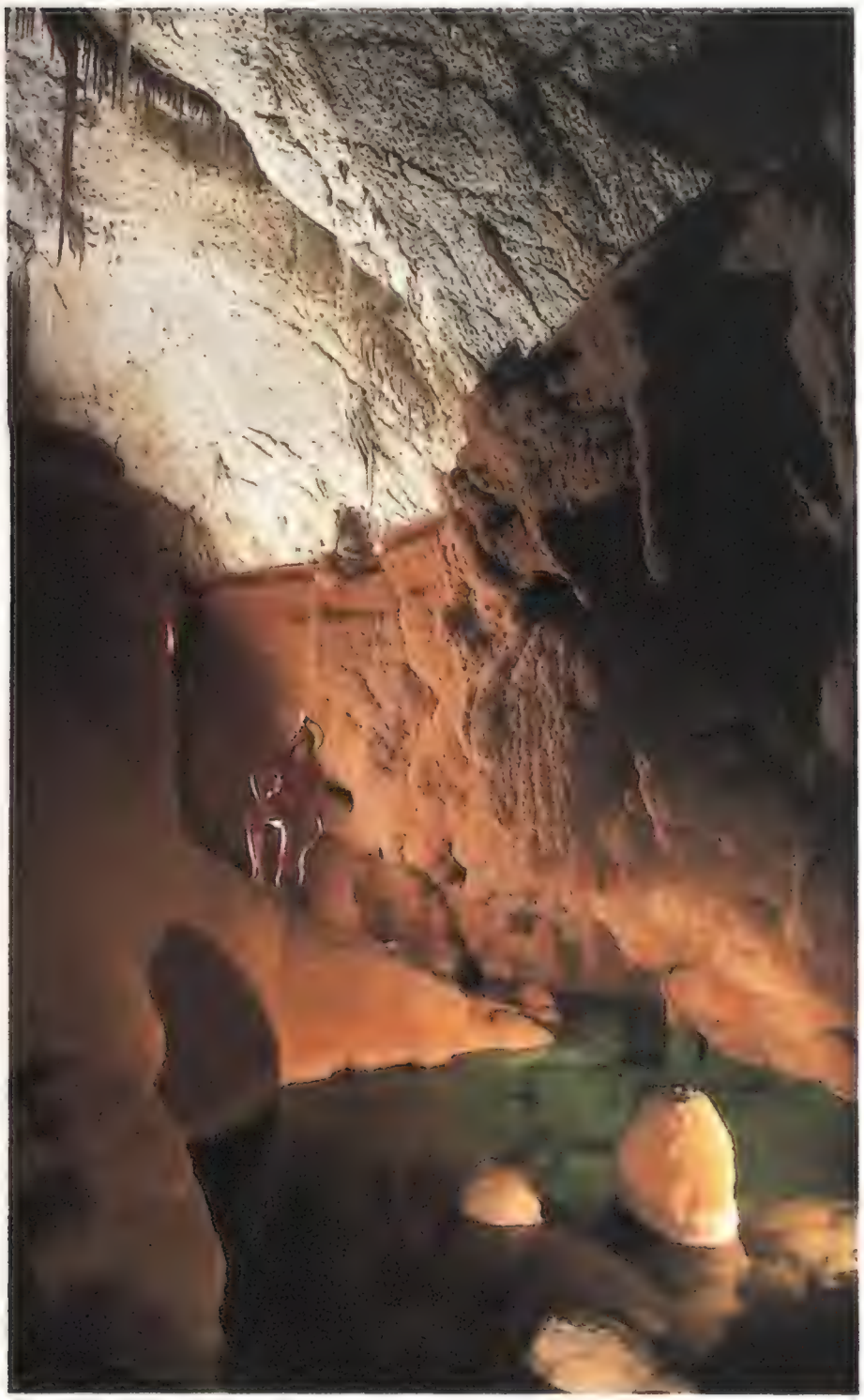
Davis later admitted he had never been so frightened in his life. He had no food or water, but he remembered that he had a roll of plastic surveyor's tape in his pocket. Methodically, he taped each passage in the boneyard as he checked it for the way back. After five and a half hours lost and alone, he emerged in the original big room—but on a balcony 30 feet above the floor. His relieved companions threw him a rope and he rappelled down.

Now, on our own trip, Bridges at last relented, saying he just wanted to do a little surveying and to look at a deep pit another team had found before we would turn back. Then he said, "If you want to check out that right-hand lead a little ways, go ahead. No-

body's been down there." I pulled myself to my feet and started off with a roll of tape. Tired as I was, the specialness of the deed entranced me. I stared at my feet as they printed tracks in the gypsum. I was in a place where, through millions of geologic years, no living thing had ever trod. I pushed only about 50 feet, but in that distance I had to climb across a pit, crawl into subtunnels in the endlessly branching boneyard, and tape my path. I went out of sight and earshot of the others, and for a few moments, the romance of caving caught me utterly.

For hard-core cavers, the supreme reward is to explore big caves: size is a higher criterion even than beauty. There are three different scales by which the giants are gauged. Perhaps foremost is depth. Right now the deepest cave in the world is France's Reseau Jean Bernard, with 5,036 feet of relief between its highest and lowest points. The most extensive cave system, by far, is Mammoth-Flint Ridge in Kentucky, whose combined passages add up to 330 miles or so. The largest single chamber, discovered only eight years ago, is a room, in a cave deep in the jungle of Borneo, with a volume of 530 million cubic feet. This is roughly 50 times that of the Washington Cathedral.

Some of the best cavers in the world, led by a powerful contingent of Americans, have for two decades been pushing a set of caves in south-central Mexico that they believe will prove to be the deepest in the world. The Sistema Huautla, which has seen the most determined effort, briefly became the second-deepest cave in the world. So frenzied is the pace of world caving, however, that Huautla now stands sixth, passed by recent pushes in France and discoveries in the Soviet Union.



Neeld Messler starts across Oasis Pool Room. Change in color on the wall shows how high water has been.

The Mexican systems are so extensive that multiday camps underground are required to push them. In addition, the high water level has required the melding of cave diving with conventional caving. The dangers of these Mexican caves are legion—and not always predictable. In 1969 some Mazatec Indians, convinced that cavers must be consorting with devils, cut the rope at the mouth of La Grieta while a woman named Meri Fish was on it, in the middle of a 200-foot shaft. By a miracle, she landed on a ledge and was only bruised, coming to a stop inches from a 100-foot free plunge.

In early August 1987, the depth of Lechuguilla reached 1,058 feet, thereby exceeding by 20 feet its famous neighbor, Carlsbad Cavern. Subsequent expeditions pushed the depth another 150 feet. During the several days I hung out at the project headquarters a year later, a series of teams extended the depth record from 1,207 to 1,415 feet, vaulting Lechuguilla to the rank of second deepest in the United States. (They have since reached 1,501 feet.) Only Columbine Crawl, in Wyoming—"a death hole, a horrible cave" according to Bridges—is deeper, at 1,550 feet.

Sorting cavers into effective teams

The exploration of a big cave requires not so much brilliant individual effort as the smooth coordination of survey and reconnaissance teams. Park Service policy allows no more than 20 people (say, five separate four-man teams) to be in Lechuguilla at any given time, and requires that all visits contribute to the exploration. Project coleaders Roy Glaser, John Patterson and Bridges announce, at regular intervals, ten-day or two-week expedition periods, welcoming pretty much any experienced cavers who want to come, and trying to sort them into effective three- and four-person

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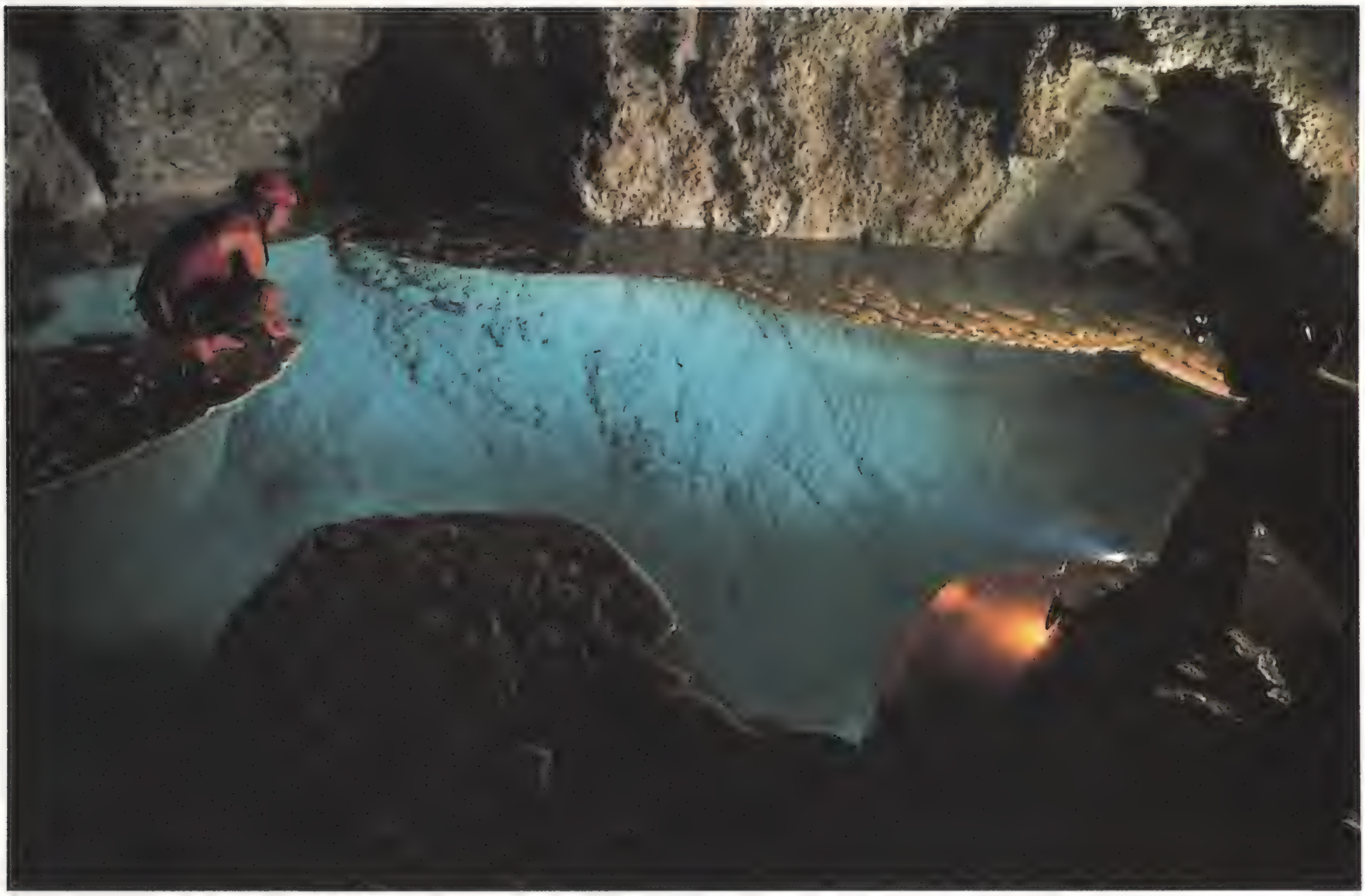

Ben Langwell (left) perches on a shelfstone ledge to peer into the 25-foot-deep water of Lake Chandalar.

The "shelves" start as rafts of floating carbonate material on pool edges, can grow to be a foot thick.

teams. Accustomed to the internecine rivalry of rock climbing areas, I was delighted to witness a rendezvous of about 60 cavers, who had come from as far as California, New York and even Switzerland, united in a common purpose. The rampant euphoria could have launched giant balloons—for each of these zealots sensed that he was unlikely in the rest of his life to get a chance to push a better cave than Lechuguilla.

Park Service officials have been extraordinarily cooperative. Ron Kerbo, the only cave specialist in the NPS system and an innovative caver himself, had drafted the thoughtful, go-slow policy for the development of Lechuguilla. Park superintendent Rick Smith called the new cave "the most exciting thing that's happened in my career."

Local citizens, seeing a commercial bonanza in another cave the size of Carlsbad, are agitating to "open it up," decrying the "elitism" of saving it for experts. As remote and serious as pristine caves are, no wilderness can be trivialized more easily. For many cavers, the nightmare is an elevator shaft blasted from the cactus-and-yucca-studded surface down to the middle of the Western Borehole.

It had taken five pushes over three months to reach the 750-foot level in Lechuguilla. The elevator in Carlsbad takes you to that depth in 57 seconds. To Jim White, the rancher who pioneered Carlsbad at the turn of the century with cowboy boots, baling wire and lantern, Carlsbad had been even more of an adventure than Lechuguilla was for Rick Bridges. Today, in the deep chamber White risked his life to find, you can eat sandwiches and buy souvenir T-shirts.

Carlsbad is accessible to nearly everyone. Twenty-eight million people have entered the cave since it opened as a national monument in 1923 (it became a park seven years later). I was perhaps the 300th person in Lechuguilla. Kerbo estimates that in Carlsbad 18,000 irreplaceable cave decorations have been broken or stolen. Caves are so sensitive that Carlsbad workers regularly clean the formations of lint, hair and flakes of human skin that encourage the growth of mold and algae. (The depredations of mere human presence have forced the closing of Lascaux Cave in France, with its famous prehistoric paintings.) After my own visit to Carlsbad—one of the best-run "developed" caves in the world—I could not help wondering what visitors missed

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The entrance pit to Lechuguilla, 90 feet deep, offers none of the natural grandeur of nearby Carlsbad.

by not seeing this awesome place in anything like its wildness. As we got out of the elevator, the operator asked a group how they had liked the cavern. A young boy blurted out, "It wasn't scary!" The loss, I thought, was his.

Most of the Lechuguilla cavers were too poor to rent motel rooms; during the expedition they crowded into a pair of rustic cabins near the park headquarters, each paying $2 a night—meals they cooked themselves. The floors conjured up some college crash pad, with battered helmets, dirty clothes and old sleeping bags strewn everywhere. I found myself drawn to the ingrown society of these cave fanatics. They reminded me of the homey, oddball ranks of climbers I had joined in the late 1950s, when I had first taken up mountaineering—an all but vanished breed today, now that climbing has become a trendy sport whose stars wear Day-Glo Lycra and make good money endorsing everything from tents to lipstick.

American cavers pore over home-printed journals full of rapturous narratives of virgin passage. They're still pleased to meet another caver—while climbers bemoan the waiting lines that form below popular routes. Cavers put bumper stickers on their cars that read, "Think Mud"; they wear T-shirts with the logo "*Murcielagos Necesitan Amigos*" (Spanish for "Bats Need Friends").

Most of them, like Rick Bridges, nurse desultory careers, free from 9-to-5 demands, simply to support their caving habit. A case in point is the bearded, soft-spoken Donald Davis, who turned 50 during his latest trip to Lechuguilla. Davis scratches out a meager income selling his home-raised honey at Colorado flea markets; he lives for caving. Despite his age, he was one of the strongest pushers at Lechuguilla.

Davis is also a caving innovator. Before a trip to Spanish Cave in Colorado, he had been wondering whether that well-known system connected with a higher hole called Frank's Pit. In wet areas like Kentucky, cavers have done dye tracing in streams to demonstrate linkages before the actual connecting passage was found. The only thing flowing in Spanish Cave, however, was wind. Davis spotted a road-killed skunk, and an idea came to him. He stopped his car, milked the skunk scent into a half-pint jar, then later soaked a rag in the powerful stuff and had a friend place it at the mouth of Frank's Pit while he and other cavers hiked to the entrance to Spanish Cave. "After a while," he recalls, "it hit us like a bomb."

In Lechuguilla, after 11 hours underground, Bridges led Scott, Randy and me back along the endless uphill trail toward the entrance. So convoluted is the place that Randy and Scott had trouble naming the major rooms as we passed through them on our return trip. In the White Christmas Tree Room we lay in the calcite flakes to take a 90-minute nap. Bridges was snoring peacefully within 30 seconds, but, weary though I was, I felt too nervous to fall asleep.

When we came to Boulder Falls, with its 150-foot rope climb, Bridges went tandem with me, hanging 20 feet above to coach as we ascended the rope together. I had learned a lot from the rope climb in Manifest Destiny, and to my gratification I got up Boulder Falls in reasonable time and style.

At 8:15 on the morning of a new day, I emerged from Lechuguilla after a push of 18 hours. As the sun touched my head and shoulders, I breathed in the smell of earth, and saw the green of grass and the blue of the sky, and I could not help whooping out loud—wordless cries of self-congratulation at my successful rebirth into the world.

My legs and arms were sore for days, and I felt a persistent, leaden ennui. The night after my long trip, I had obsessive textural dreams—of miles of gray tunnel, mountains of rubble, speleothems spilling through my hands. I woke at 5 A.M. and drove to the top of Carlsbad mesa, where I stood facing east, waiting for the sun to rise. I craved sun for a week after my adventure.

And yet, one evening I found myself wondering what lay beyond that last bend of boneyard in the right-hand passage I had pushed above Manifest Destiny. Wouldn't it be great, I thought, to go back down there and give it another shot?

Across a small lake, Lebarge Borehole, about 40 feet wide, leads to deepest part of cave known so far.

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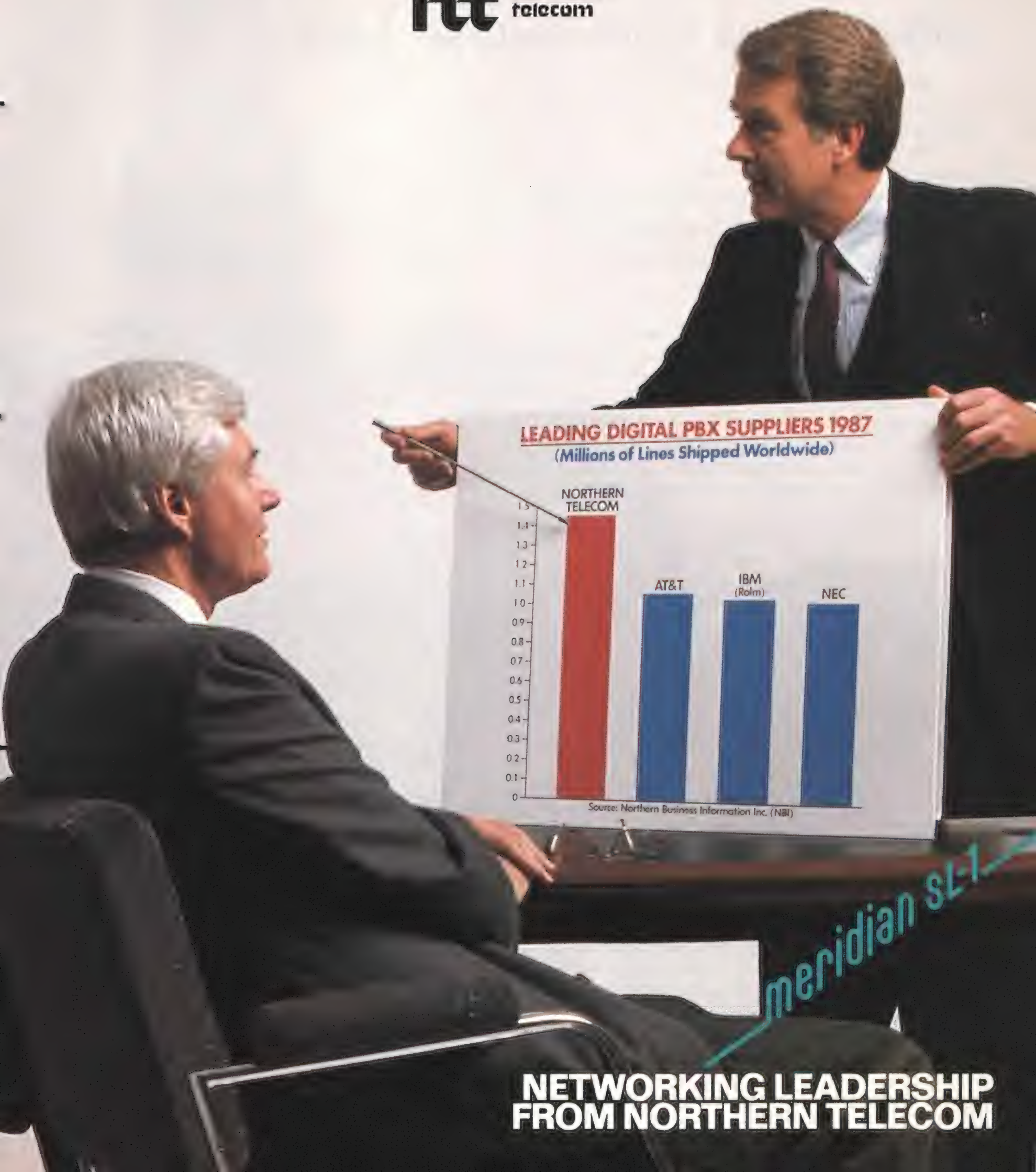

By Bennett Schiff

Seven centuries of samurai treasures come calling from daimyo Japan

A sumptuous collection of Japan's most revered objects, showing how feudal life shaped the nation, opens at the National Gallery of Art

There is embedded in the American consciousness a kind of dreamland Japan, a state of mind, a beguiling haze of Kurosawa films, Lieutenant Pinkerton and Butterfly, Pooh-Bah, Nanki-Poo, samurai and shogun. That image is a mélange of cliché, superficiality and, often enough, pure misconception. Now the National Gallery of Art in Washington is presenting a clearer picture of Japan in a large, unusual and quietly incandescent exhibition. It opened October 30 and will run to January 23, 1989. It will not travel.

Appreciating the show requires some background knowledge of Japanese political and cultural history, which, to a degree unknown here, are deeply and extensively intertwined. The show can be thought of as the second opening to the West of that elusive country; the first is reflected in that condescending, rote phrase known to every schoolchild: Commodore Matthew Perry opened Japan to the West in 1853. As if he had zipped open a bag, thrown back the door to a closet. (In the late 17th century the city of Tokyo, known then as Edo, site of the Tokugawa shogunate, already had a population of 1,200,000 as compared to London with 800,000 and Paris with 500,000.) The show is designed to display and explain some essential things about the country, to inform, elucidate and to entertain as well. It is an ambitious venture in this direction at a time when, for economic reasons, relations between the two countries seem to be reaching one of the lowest points since World War II.

It is notable that the way Japan has chosen to explain itself is a cultural one: through its most revered and respected arts—fine, decorative and performing. The Japanese, on the highest levels, still feel misunder-

A great general, Minamoto Yoritomo (1147-1199) became the first shogun of the Kamakura shogunate in 1192. Here he wears aristocratic court dress.

stood by the West. This, therefore, is not just an exhibition of art. It is an attempt to present something fundamental and deeply felt concerning the structure of an entire society. Yusuke Watanabe, an executive director of the Japan Foundation, the government agency that fosters international cultural exchanges and that is one of the organizers of the show, called it "epoch making." So much has been put into this show, unprecedented even in Japan itself, "that people have asked why we have not held this kind of exhibition here at home," said Hiroyasu Uchida, former director-general for cultural properties protection of the Japanese Agency for Cultural Affairs, another sponsor. The Ministry of Foreign Affairs has used its good offices from the beginning. On the American side, the co-organizer is the National Gallery of Art. Financial supporters include the R. J. Reynolds Tobacco Company, the Yomiuri Shimbun, the Nomura Securities Company, Ltd. and the Asahi Shimbun.

The idea for the show was announced in 1983 during the summit meeting between President Reagan and

Of polychromed wood, 18th-century No mask of the character Koomote represents calm young woman.

Prime Minister Yasuhiro Nakasone, during which they discussed deepening cultural relations between the two countries. Though originally planned to highlight the historical collection of one family, the exhibit eventually grew to encompass several important periods in Japanese history. The show is entitled "Japan: The Shaping of Daimyo Culture 1185-1868." ("Daimyo" is a sort of baronial title going back to medieval times, the bearer of it being the master of samurai and the vassal of a shogun.) The exhibit contains more than 450 items including 8 National Treasures, 133 Important Cultural Properties, 26 Important Art Objects and 300 other rare and beautiful objects. They have been gathered from Buddhist temples, Shinto shrines, the national collection, corporate collections and individuals—altogether the largest and most valuable aggregation ever to have left Japan.

Unlike previous exhibits on Japanese art, the objects included were chosen jointly by American *and* Japanese organizers, and help to correct a glaring omission of exhibits past. "For the first time, we are showing the Japanese portrait tradition en masse," says the show's curator, Princeton University art and archaeology professor Yoshiaki Shimizu. He adds that few in this country have been exposed to Japanese portraiture, as previous museum shows have tended to highlight objects, leaving people in the background. Of the dozen items that Shimizu would most want to save from the proverbial museum fire, six are portraits, including *Minamoto Yoritomo* (p. 74), *Mounted Warrior* (p. 73) and (p. 75) *Daruma (Bodhidharma).* He would also save other objects representing nearly all aspects of the exhibit, which, in addition to portraits, includes paintings, sculpture, ceramics, clothing (has there ever in history been more beautiful clothing than traditional Japanese dress?), No masks, armor, saddles, swords, calligraphy, musical instruments, tea utensils

Chūkei fan shown here is an important accessory used for female No roles, always played by male actors.

Hannya mask expresses rage and fury of a woman who has been betrayed in love and becomes a demon.

Like masks above, used in performances of *kyōgen* and No, a specific fan symbolizes a specific character.

and screens. During the exhibit, a master of the No drama, Otoshige Sakai, designated a Bearer of Important Intangible Cultural Assets by the Japanese government, will perform. The Grand Tea Master of the Yabunouchi School of Tea, Seiseisai Chikuchu Jochi, will conduct the opening tea ceremony in a specially built replica of a traditional teahouse.

The show is a Japanese version of "The Treasure Houses of Britain" (SMITHSONIAN, October 1985), the blockbuster exhibition held at the same venue, with a fundamental and profound difference. The English exhibition was one of taste and acquisitiveness. The Japanese show is a distillation of reverence for objects and paintings that were actually put to use, either daily or for specific occasions. They were a part of a way of being, a system of ethical behavior, at times formalized ritual, a kind of liturgy; drinking tea, going to the theater, arranging flowers are a good deal more than drinking tea, going to the theater, arranging flowers. The habiliments are entrancing simply because they are so felicitously expressed in line, texture, color and design. But it is a surface beneath which lies the essence of an entire national culture, and if you want to begin to understand it you will have to put in a little time and effort.

The show covers the nearly seven centuries from medieval times to the preindustrial period of Japan. It begins in the 12th century when the emperor was displaced as the wielder of political power by a shogunate form of centralized government, which maintained strict control of the country through a network of daimyo lords. The daimyo enjoyed life-and-death power over their vassals and employed armies of samurai warriors, probably the most strictly trained human instruments of war ever to have existed. The period came to an end in 1868 with the Meiji Restoration, when the emperor was reinstalled as the central figure of the government and the shogun system was disbanded.

It is possible to think of daimyo culture in terms approximating those in which we think of Western medieval history—in terms of feudal lords, of aristocratic landed gentry who were also commanders of great armies. In Japan today the daimyo are memorialized in places like Hagi, an idyllic little city of about 55,000 in the southwest corner of the large island of Honshu on the Sea of Japan, a key site of daimyo control in early times. It is notable for the ruins of a great fortress and for street after street of domiciles of the kind that samurai inhabited hundreds of years ago, a rarity in today's Japan. A daimyo memorial ground is here, a forest of stone monuments, fanciful and grand,

Bennett Schiff, who is a member of SMITHSONIAN*'s Board of Editors, wrote most recently about sculptor Gaudier-Brzeska, in the June 1988 issue.*

Ceremonial sword mount of 17th century incorporates rayskin, lacquer, copper, gold, enamel and leather.

Made of iron, leather, lacquer, silk and gold, this commanding suit of armor dates from 16th century.

surrounded by hundreds of 6-foot-high granite lanterns, each bearing a ghostly resemblance to a standing man, each marking the passing of a fallen samurai. Set into the hills, the lanterns climb implacably, a stately progression, until they come to a climax at a terrace on which stand ten commanding, commemorative (there is no actual burial here, bodies are cremated) daimyo memorials, 15-foot-high monoliths, overlooking all. The backdrop, thickly wooded, rises toward the crest of a steep hill. It is one of the most-commanding and least-known great memorial grounds of the world.

Who were the people commemorated here? The daimyo rose, most experts agree, somewhere about the tenth century as the imperial court in Kyoto began to lose control and interest in the provinces. In those years the daimyo were no more than country squires and rural military chieftans. As the emperor's central military power waned, the court, in effect forming a series of alliances, began to rely on the provincial bands to keep order more or less and to protect the sanctity of the capital. As their power grew, inevitably the leaders of these local factions became involved in court politics.

One of the first of these was Minamoto Yoritomo who, in the late 12th century, gained acceptance by the court and was given the title *seii-tai-shōgun* (Great General Who Quells the Barbarians), the diminutive of which was "shogun." Yoritomo's ascendance established a new kind of hegemony. He was recognized by the emperor as the executor of delegated authority—and the executioner as well, if need be. You might think of the shogun as a kind of prime minister without accountability to a parliament, a president without a congress; in effect, a totalitarian commander.

The six centuries that followed, a complex period of

Saddle from 1498 and stirrups were embellished with lacquer, gold sometime during 17th-18th centuries.

Japanese history, are deftly elucidated by Martin Collcutt, professor of Japanese history and East Asian studies at Princeton University, in the comprehensive and handsome National Gallery catalog that accompanies the show. With the shoguns, Collcutt says, "began a political arrangement that was to endure for the almost seven-hundred-year period . . . in which emperors heading the imperial court in Kyoto continued to embody a sacerdotal sovereignty while powerful warriors (as shoguns or military hegemons) were delegated with authority to rule. The emperors retained their legitimating function, and at times individual emperors sought to retrieve the powers granted to warriors, but until the mid-nineteenth century warriors controlled the movement of Japanese history, appropriating political, economic, and even cultural leadership."

Following the death of the first shogun, Yoritomo, in 1199, the shogunate government continued under sometimes turbulent, sometimes peaceful conditions as shoguns and daimyo lords rose and fell. The middle of the 15th century ushered in a hundred years of nearly constant combat between rival lords. In Japanese history it is known as the *sengoku*, the "country at war" period.

But at the end of the 16th century three uniting fathers, so to speak, brought things under control. You might think of them, without any specific political parallel being suggested, as figures of the stature of, say, Jefferson, Hamilton and Adams, putting girders into place upon which a nation could establish a solidifying structure embracing politics, economy and the arts.

They were Oda Nobunaga (1534-82) and his successors, Toyotomi Hideyoshi (1537-98) and Tokugawa Ieyasu (1543-1616). Between them they established a centralized system of control with the shogun at the

A 14th-century silk scroll elegantly depicts an elite, battleclad warrior brandishing sword from his steed.

Opposite: In this spare yet powerful scroll portrait, first shogun Minamoto Yoritomo is robed for ceremonial occasion. Dating from 13th century and now a National Treasure, portrait is as well known in Japan as the *Mona Lisa* is throughout the Western world. Above is 15th-century image of Bodhidharma, a 6th-century Indian prince and progenitor of Zen Buddhism, which was imported to Japan and widely adopted. At right is the 16th-century portrait of an aged Zen patriarch who shoulders a hoe used in planting pine saplings.

The *taiko* drum, this one from the 18th century, is one of three types used in No performances.

Uchikake, outer garment favored by samurai-class women, is embroidered with blossoms, clouds, screens.

head and launched an unprecedented period of peace lasting for almost 300 years. (It was this Ieyasu, founder in 1603 of a line of shoguns in power until the Meiji Restoration, who was the hero of James Clavell's *Shogun*, a novel and later a TV series remarkably accurate in evoking the time and the society.)

Under the Tokugawa shogunate there were 250 or so daimyo lords, each in charge of an assigned fief. Although the daimyo continued principally to be military leaders in a militaristic society, the years of peace under the Tokugawa engendered the cultivation of the arts as well as the construction of massive castles and urban residences.

The model samurai, daimyo and, ultimately, the shogun himself were, in Collcutt's words, "ruthless in warfare, ready to die for honor, adept in administration and practical affairs but able and eager, in times of peace, to enjoy literary and cultural pursuits."

In effect, the daimyo elite during the Tokugawa era became landed aristocrats aware of their military heritage but with no wars to fight, concentrating more and more on administration of the estates and the leisurely pursuit of the arts. The daimyo was expected to appreciate poetry and in many cases to create it, to understand the nuances of painting and architecture, to be an advocate of the No theater, to practice calligraphy, to understand the subtlety of flower arrangement and, of course, to understand the profound spiritual significance of the serving and the drinking of tea—its implements and the place in which it was made and served.

Whisking creamy foam in precious bowls

Tea in Japan is more than tea, as any Westerner who spends much time there soon learns. The principles of the grand tea masters on how to serve tea have influenced flower arrangement, calligraphy (itself a way of life), pottery, literature, architecture, and much about how to look at life and how to live it. The tea ceremony pays homage to balance, quietness, harmony and purity. It is a ritualized experience. The path through a garden to the teahouse is irregular. It is not a place you get to along a plumb line. Each selected stone in the path is to be appreciated, as is the garden itself, the waterfall, the carp as they perform light-struck and shadowy abstract arabesques in the pond. You enter the spare, bare little teahouse through a door only about three feet high. You stoop to get in, which begins to put you into a humble frame of mind as you forget the outer world. Each movement of the master is conducted with spare dignity and grace: the pouring of the water, the dipping of the powdered green tea into the bowl (the bowl itself can be as precious as diamonds), the whisking of the tea into a creamy foam, the bestowing of the bowl. You then turn the bowl three

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Ming dynasty hanging scroll from mid-16th century depicts the Buddhist priest-diplomat Sakugen Shūryō.

times in order to appreciate its varied beauty of color, texture and form before you sip.

This same sense of purity, form, tradition, stillness, line, color, volume, texture and inner calm is the essence of Japanese art and of the best part of Japanese life. And the same passion, dedication, seriousness and respect is at the bottom of, say, baseball, for which there is a blazing rage in today's Japan (SMITHSONIAN, September 1986). Japanese professional baseball players are modern-day counterparts of the samurai. What was understood, if not always practiced, by shogun, daimyo and samurai is still understood as an ideal, if not practiced by Japanese men, women and, yes, children, today: that when the baseball game is done, when the car is assembled, when the homework is completed, it is time for the tea ceremony, for drawing with ink and brush, for practicing calligraphy, for looking at a scroll painting, for going to the No theater, to the Kabuki theater—a cessation of what *must* be done so that one can practice what one *should* do.

For a daimyo under the Tokugawa shogunate, it was a cultivated life but also a disciplined one. The daimyo had to spend every other year in attendance to the shogun in Edo, and during alternate years when he returned to his estate his wife and children were expected to stay at the Edo fortress city as a sort of safeguard, in actuality comfortable hostages of the shogun. The system insured a constant surveillance of powerful daimyo by a shogun always on the alert to the possibility of a takeover.

When the takeover did come in 1868 it was relatively bloodless and complete. Known as the Meiji Restoration, after Emperor Meiji, it was carried out by a group of revolutionary young samurai who were eager for Japan to resist foreign incursions and who wanted to reform what they saw as a corrupt government. In the space of a few years the new government dissolved the daimyo domains peacefully by buying them out, and the daimyo themselves were integrated into the aristocracy of a new imperial order.

The ways of bu *and* bun

Yet daimyo culture is still reflected in Japan today, perhaps most clearly in the concepts of *bu* and *bun*. They are basic to Japanese life. *Bu* is the way of life of the warrior. *Bun* is the intellectual and spiritual side of existence. In Japan, beginning in the Middle Ages, the two were synthesized. Each had its place. Together they were how you were meant to live. "What may at first have been assumed as a convenient veneer . . . to dignify naked military power, soon became a consuming interest in its own right," Martin Collcutt writes, "so much so that in much of Japanese warrior culture we can detect both complimentarity and tension

between the demands of *bu* and the appeal of *bun*."

Each item in the show has its place, not as a single work of art but as an integral part of how one was supposed to conduct the business and the beauty of life. Some facet of *bu* or *bun*, or the synthesis of both, can be seen in virtually every object in this exhibition, says Collcutt.

In daimyo Japan, culture became synonymous with authority. Lords competed with one another in high art, tea, theater, poetry and the employment of artists, actors, poets, tea masters. Frequently they practiced one or more of the arts themselves. Not to participate was to be dropped out of what was meaningful and necessary. It is difficult, perhaps impossible, to name another society in world history in which art was so much a part of daily existence, a way of perfecting daily existence, a path to an ideal state that was private, inviolate, harmonious with life and with nature.

The worship of nature and of ancestors, a reverential respect for the inherent spirit of things and of places, is the basis of Shinto, the ancient traditional religion of the country. Zen Buddhism, introduced to Japan by Chinese monks in the 12th century, added a deeper dimension of intensely solitary meditation, leading to exalted states of identification with an idea of an ideal universe. Zen, absorbed into Japanese consciousness, added widely to the manner in which the arts were created; the monochromatic painting that characterized the Chinese Sung and Yuan periods became an important mode in Japanese visual art. The intensely spiritual and dramatic No theater, which dealt with life and death, dream and illusion, came out of Zen Buddhism as did the entrancing—in the deepest sense of the word—temple gardens of rock, patterned sand and gravel, and a shrub or two so miraculously placed and in such proportion that a few feet of space can come to represent a world.

I had stayed for two days and nights in a Buddhist temple in a quiet residential section of Kyoto. At dawn, in a smoky light, the temple drums had summoned the monks, who were chanting now. There was a lavatory—a functional place, very simple. There, on a shelf just over the communal urinal, in a cast-off tiny glass bottle of no distinction whatever, was a twig of flowering plum and a wisp of dried grass that was so perfect it took my breath away. Outside, in an open courtyard were the tiny garden, shrubs, rocks, some trees. And, there was a heavy rain.

That belongs to the *bun* side of Japan.

And everywhere else.

Summer Landscape by Sesson Shūkei, 16th century, shows his mastery of detail and drama of the land.

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Sydney, Melbourne, Tasmania and the fjords of the New Zealand coast.

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The enchanted, unspoiled isles once explored by Captain James Cook: Tahiti, Hawaii, Fiji, Bora Bora and Pago Pago.

SCANDINAVIA/RUSSIA

Copenhagen's Tivoli Gardens and the Czar's Palace in Leningrad.

CANADA/NEW ENGLAND

French Montreal, the cobble streets of walled Quebec and the spectacular autumn foliage along the New England coast.

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By Bruce Hathaway

Circuitry wizards and New Agers alike can get good vibes from quartz

A crystal long revered by soothsayers, gem artisans and rockhounds is now the jewel of electrical engineers as well as psychic healers

New Age jeweler Uma Silbey illumines quartz bracelets that many customers hope will cure what ails them.

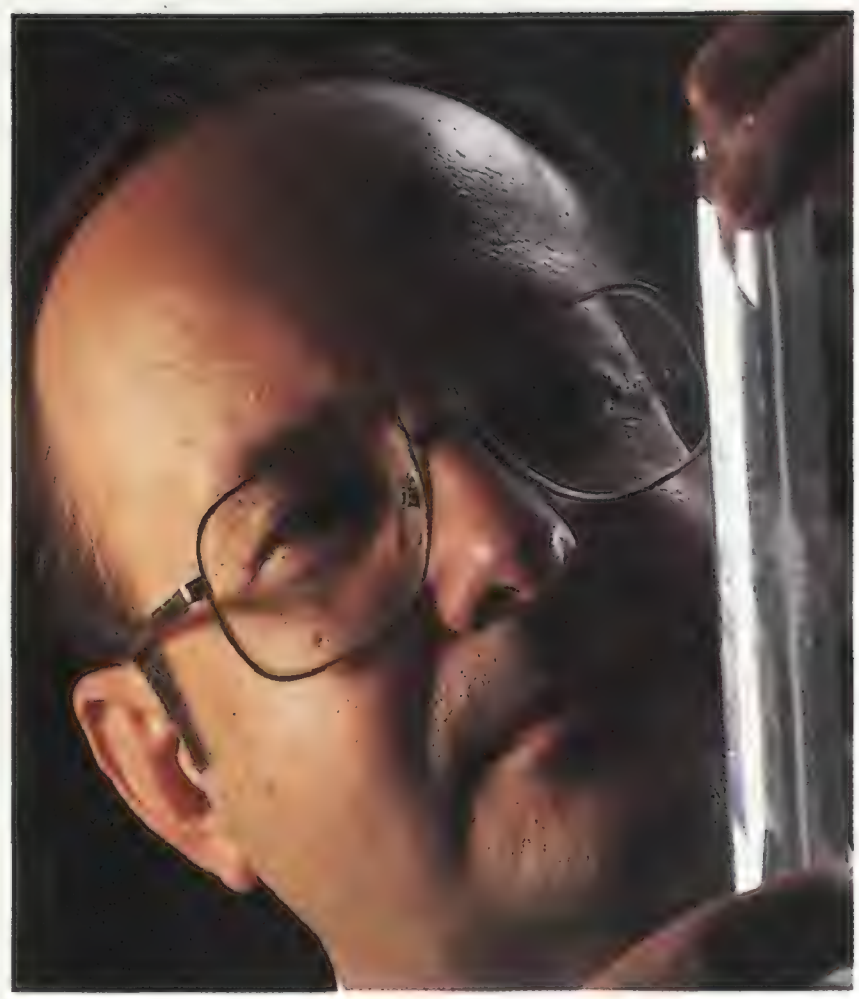
When you first meet them, you'd never guess that the one thing Joseph Balascio and Uma Silbey have in common is also what's most important to each—crystal vibrations. Balascio is archetypal Radio Shack: pens at the ready in his shirt pocket, no-nonsense shoes and a very efficient-looking haircut. He's an engineer who speaks in clipped phrases and obviously lives in a hard-data world. Silbey, on the other hand, exudes a definite mystical aura: long, flowing blonde hair, intense eyes and large pieces of crystal jewelry that look as if they'd been designed on another planet. Her given name is Marilyn, but she now prefers Uma—a Sanskrit name for a Hindu goddess. She thinks in spiritual terms like "balancing," "the heart's mind," "cosmic delight" and "inner truth."

But both of them, in fact, are in the business of crystal vibrations, and they agree that the best source of these is common quartz. Balascio supervises the hydrothermal operations involved in growing quartz crystals for electronic devices at a Motorola facility in Carlisle, Pennsylvania. "Mention quartz and most people think of crystal balls or chandeliers, or something that's of little interest to anyone but a rockhound," he explains. "However, tiny wafers of quartz are at the heart of umpteen things we use every day—almost everybody's wristwatch, electronic clocks, remote telephones, personal computers, VCRs, CB radios, your color television set, and even many washing machines."

At Motorola, Dave Keebaugh inspects artificial crystal for flaws that would limit its value in electronics.

Slivers of quartz embedded in the innards of radio and TV transmitters keep the thousands of broadcast frequencies from jumbling together into a chaos of sound. They allow hundreds of telephone conversations to travel through a single channel without mixing. And, quartz crystals are the crux of most precision time systems. They've already made possible wristwatch-size "data centers" and Smartcards—credit-card-size plates with microprocessors (tiny computers) whose memories can store anything from account records to a person's medical history. Before long, we'll all have fantastic Dick Tracy-type wrist telephones. Thanks to quartz, stopwatches—until recently, expensive, recondite pieces of equipment jealously guarded by timers at sports events—are common and cheap.

Doug Shotts removes crystal bricks—hydrothermally cultured from natural quartz—from a giant autoclave.



Joseph Balascio, Motorola engineer, checks ultrapure crystal, a type needed for aerospace electronics.

The gist of modern electronics technology is precision frequency control, which might seem to have nothing to do with a "common rock" like quartz. But its atomic structure allows quartz to precisely regulate electrical circuits vibrating at millions of cycles per second. "Fortunately, quartz is one of the most prevalent minerals on Earth," observes Balascio. "It's as if Mother Nature foresaw the needs of the Information Age."

Silbey also relates the abundance of quartz to Divine benevolence and even believes that the essence of life itself is represented in its crystalline structure. She and her husband, Ramana Das (also a spiritual name), own Uma Inc., a Marin County, California, company that markets quartz crystal jewelry to New Age spiritualists who feel it can heal the sick and connect souls to the Eternal Light. This interest among the cosmic-culture crowd isn't as far out on the occultist fringe as you might think. Even mainstream publishers list titles on quartz enlightenment, and hundreds of crystal shops, advisers and lecturers across the country have levitated the metaphysical interest in quartz into a multimillion-dollar industry. Crystal Adventures and other companies now offer luxury tours of quartz deposits in Brazil and Madagascar so New Age pilgrims can dig their own.

"The recognition that quartz crystals have unique energy-channeling potential is nothing new," observes

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		Model	Body	Relative Frequency
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✔	2.	Buick Electra	SW	48
✔	3.	Buick LeSabre	SW	52
✔	4.	Oldsmobile Custom Cruiser	SW	55
	5. Tie	Mercury Grand Marquis	2D	57
	5. Tie	Ford Crown Victoria	SW	57
✔	7. Tie	Pontiac Bonneville	4D	58
	7. Tie	Mercury Grand Marquis	SW	58
✔	9.	Chevrolet Caprice	SW	59

Source: Highway Loss Data Institute. **Body Styles:** SW = Station Wagon, 4D = Four Door, 2D = Two Door. All results are stated in relative frequency of overall injury claims: 100 is average.

The Highway Loss Data Institute (HLDI) is a non-profit public service organization associated with the Insurance Institute for Highway Safety. As it does annually, HLDI has just summarized and published its findings on the frequency of automotive insurance claims.

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Silbey. "Throughout history you'll find examples of cultures that believed quartz could magnify psychic energy and healing powers. Many aboriginal medicine men have viewed quartz as a 'live rock' that can treat maladies and fetch the souls of the departed. The Sumerians, Maya and other civilizations used quartz crystals for curative purposes." New Agers often state authoritatively that the great pyramid at Giza originally had a capstone full of quartz crystals. And, they contend, the king's burial chamber inside the pyramid is made entirely of Aswan granite, about 35 percent quartz, because the ancient Egyptians believed that the enormous pressure from the huge blocks above it would cause the quartz to emanate a rejuvenating energy field. In support of this belief, they cite the fact that such a conversion of mechanical force into electrical polarity is one basis for using quartz in electronics. Despite much geological and historical evidence that the continent of Atlantis is a myth, many crystal buffs are convinced that this ultrasophisticated, lost civilization was powered by quartz crystals, 25 feet long and 10 feet around, which generated a wide spectrum of energies that could be distributed to antigravity devices, force-field generators and healing temples.

Though magical and maybe even deservedly sacred, quartz certainly is not rare. In fact, it is a crystalline fusion of our planet's two most common elements: oxygen, which contributes nearly half the weight of the Earth's crust, and silicon, which accounts for another quarter of it. Silicon dioxide (SiO_2) abounds; it makes up the bulk of sand on many beaches and is the raw material for most types of glass. However, the word "quartz" describes SiO_2 only in crystalline form—atoms arranged in orderly and infinitely repeated three dimensional patterns called lattices.

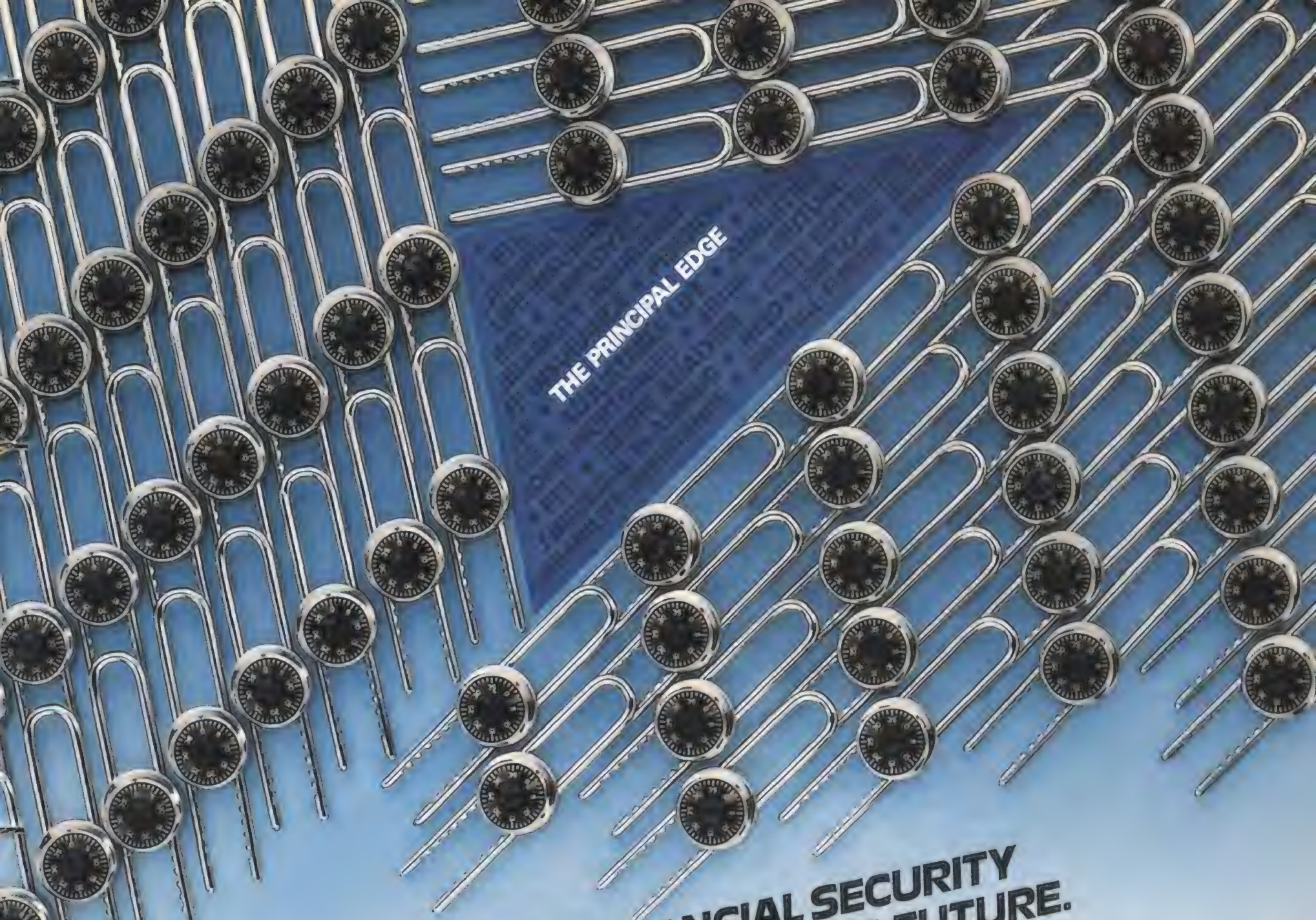
These occur in a wide variety of colors and textures, ranging from vitreous beauties like purple amethyst and yellow citrine to translucent stones such as agate and prase, which often present splendid bands and other patterns. Quartz is harder than steel, and for at least 30,000 years humans have fashioned it—in the form of flint and jasper—into weapons and tools. The ancient Sumerians made agate signet rings, beads and ceremonial axheads, and the Egyptians ground and polished agates into bowls, cups and bottles.

As time went by, the value of quartz was enhanced by mystique. Agate was thought to allay thirst, so camel drivers would hold a piece of the stone in their mouths as they crossed the desert. And the supposed sobering effects of amethyst made it popular with the spouses of drunkards and of those prone to passion. It was also thought to protect soldiers, to shield any wearer from disease and even to help hunters track wild animals. During the Middle Ages, many Crusaders swore by quartz amulets.

The most touching quartz legend is expressed in a 16th-century French verse that tells how the god Bacchus, angered at some neglect, determines to avenge himself. He declares that the first human his procession passes will be devoured by tigers. Tragically, the

Quartz occultists and crystal-ball seers have often been met with disbelief, as in 1925 film *The Great Love.*

Before radio broadcasts were quartz-stabilized, fans sat near the dials, ready to recapture a drifted signal.



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Crystal oscillators, used in many electronic devices, have cores of thin wafers cut from quartz bricks.

mortal is a beautiful maiden named Amethyst, who is on her way to worship at the shrine of the goddess Diana. As the tigers spring toward her, Amethyst seeks protection from Diana, who turns her into a white stone. On seeing the result of his ire, the repentant Bacchus pours the juice of a grape over the petrified body of the maiden as a libation, thus giving the stone its lustrous violet hue.

In fact, the beauty of quartz in the form of semiprecious gemstones such as amethyst has earned the mineral favor among artisans throughout history. Oriental carvers have created marvelous crystal balls that are, by their sheer splendor, truly mystifying (p. 100). The National Gallery of Art exhibits a number of quartz treasures including sparkling vessels—cut from clear rock crystals by late 16th-century craftsmen—and a celebrated sardonyx chalice used for centuries at the coronations of French queens. Still, it's hard to beat the Earth itself at creating quartz masterpieces. Elaborately structured and seemingly perfect quartz clusters and geodes, some several feet long—such as those at museums in Idar-Oberstein and Frankfurt, West Germany, and at the Smithsonian's National Museum of Natural History—are the epitome of magnificence among gems and minerals (pp. 94-99).

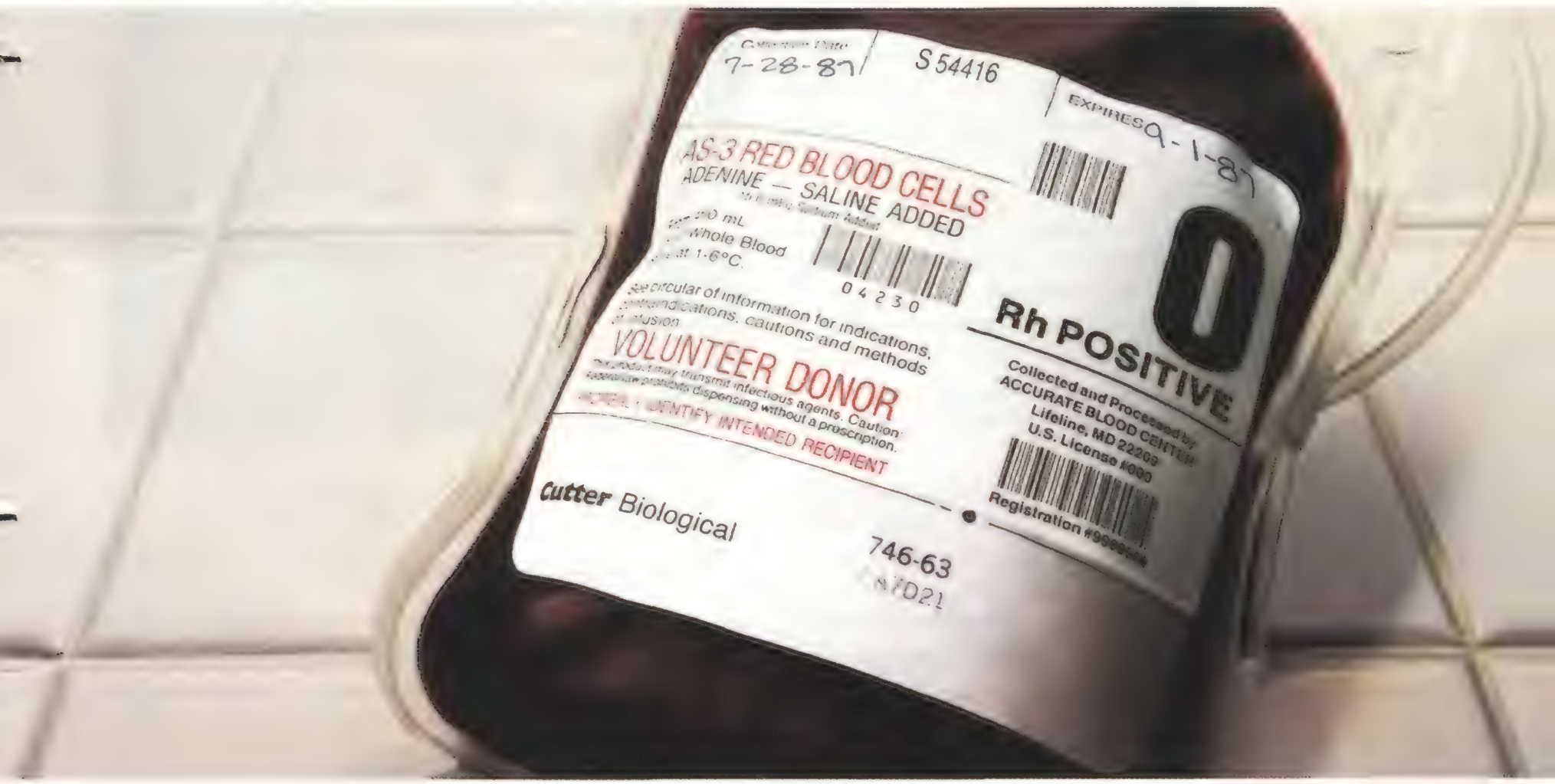
Ironically, it is the imperfection, the asymmetry, of the quartz crystal lattice that makes it useful in electronics. Though quartz spiritualists are convinced that the ancient Egyptians and Atlanteans were well aware of the mineral's electrical properties, it wasn't until the late 19th century that European scientists demonstrated them. Jacques and Pierre Curie hypothesized that subjecting crystals such as quartz to mechanical stress would generate electrical charges. In 1880, they attached electrodes to opposite sides of a slab of quartz, then placed weights on it. With increasing pressure, their electroscope registered growing polar electrical charges on the crystal's surfaces. Then, a year later, they found that giving a positive charge to one side of the quartz slab and a negative charge to the other caused it to bulge or shrink, depending on the placement of the contacts.

In an asymmetrical crystal such as quartz, pressure displaces positive and negative ions differently: electrical polarity at the surface results. Conversely, an external, alternating electrical field causes rhythmic displacement of ions: in response the crystal quivers. This two-part phenomenon subsequently came to be known as the piezoelectric effect—*piezo* comes from the Greek word meaning to press or squeeze.

Its first part—pressure on a crystal resulting in electrical polarity—can be seen in many flintless cigarette lighters and pilotless gas stove igniters: a sharp blow on the crystal in them generates a charge and hence a spark. Phonograph cartridges are sometimes piezoelectric—crystals connected to the needle translate vibrations from bumps on the record into electrical signals. Crystals have also been used in microphones to translate sound waves into electrical signals. Many transducers—devices that, for example, register the pressure in an oil well—rely on this aspect of piezoelectricity. Quartz strain-sensors already provide early warning of earthquakes, and crystals implanted in future airplanes and buildings might be able to send electrical signals that will warn of an impending

Despite months of gazing into the crystals on his desk, Assistant Editor Bruce Hathaway still awaits rejuvenation. He wrote about bubbles in September.

The difference between saving a life and threatening it.



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structural failure. There are even prospects for piezoelectric power generation, in which crystals will convert the vibrations of a helicopter or ocean waves into usable power.

The flip side of piezoelectricity—alternating electrical charges placed on a crystal causing it to vibrate—is the basis for most applications of quartz in electronics. Virtually all have to do with the control of radio waves or with keeping time. As it turns out, a crystal in an electrical circuit will, in addition to resonating at its own frequency, bring the oscillations of the circuit into exact harmony with the crystal's vibrations. The most common use of this effect likely is in operation on your wrist at this very moment. In a quartz watch, the precise vibrations of a microthin quartz disk regulate the flow of electrons that move the hands or change the digits.

Despite its enormous technological potential, piezoelectricity was little more than a laboratory curiosity for almost three decades after the Curies discovered it. Then, during World War I, French scientists, anxious to find a way of detecting German submarines, found that quartz crystals could transduce sound waves into recognizable electrical signals; they had invented an early form of sonar.

The resonance of quartz also intrigued American radio fans after it was shown, in 1919, that crystals could control radio frequencies. These were the early days of radio when members of wireless clubs were madly wrapping coils of wire around broken baseball bats or Quaker Oats boxes, attempting to receive various signals on their sets. In attics and barns around the country, the pioneers bent intently over their jury-rigged boxes and listened excitedly to ships at sea. At just the wrong instant, the transmitter drifted off frequency, the operator's voice lost in a roar of atmospheric sound. So reports of reliable quartz frequency control swept the country, and wildly enthusiastic amateur hams quickly began making their own crystals.

Quartz crystals like these will keep time or control frequencies in avionic and telecommunications devices.

McCoy Electronics worker cements wires to electrode that will transmit charges from crystal to circuit.

However, cutting and shaping crystals for radio transmitters was pretty much a hit-or-miss operation until 1934, when a group of students at Dickinson College, in Carlisle, Pennsylvania—now a center of the quartz crystal industry—persuaded Grover Hunt, a college custodian, to help them. His daughter Harriet Fanus, now retired after 22 years at Motorola, recalls: "My father was a chess player, and once on a visit to the Painted Desert in Arizona he got the idea that he could make a fortune by carving the petrified wood he saw there into chess pieces. He took out the car seats, loaded boxes on the roof and creaked along back to Carlisle. The chess piece business fizzled, but the college hams heard about the rock saw he was using. While teaching them how to cut with it, my dad eagerly learned all about quartz electronics from the students. He soon developed a lapping machine that mechanized the process of making quartz radio crystals and in a few years he was a millionaire."

Quartz crystals quickly became the standard means by which radio stations controlled their broadcast frequencies. "The first was WEAF in New York City,"

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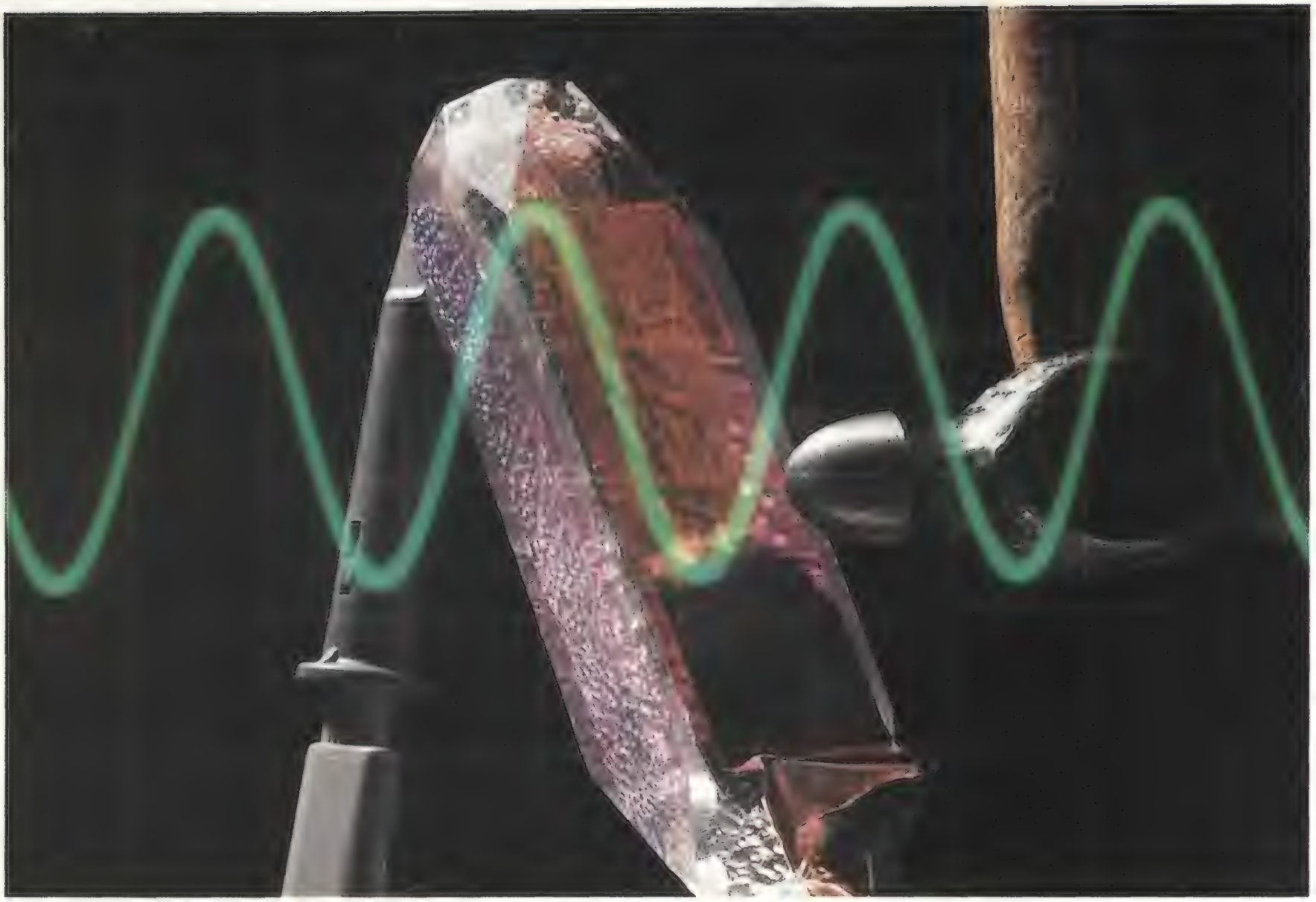


One use of quartz crystals in electronics is based on their ability to translate mechanical force, such as a blow from a hammer, into electrical energy, depicted here by a wave on an oscilloscope screen.

notes Virgil Bottom, an Abilene, Texas, piezoelectricity expert. "They broadcast at 610 on the AM dial, or 610 kilohertz—meaning that they emitted radio waves with a frequency of 610,000 cycles per second. A little piece of quartz the size of a nickel inside their transmitter was cut to vibrate at that same rate and it kept their broadcasts on the correct frequency." Today, radio stations still rely on quartz crystals to do the same thing. The thinner the quartz wafer, the higher the frequency of its vibrations—this holds true for other electronics applications as well.

The '30s saw a handful of crystal manufacturers emerge, but nowhere near enough to supply the need for quartz radios in World War II. Early on, pilots and tank commanders pleaded for crystal radios capable of keeping frequencies firmly in tune. In response, the U.S. Army Signal Corps fervently recruited companies to manufacture crystals. Indeed, supplying reliable quartz radio crystals was later seen as second in strategic importance only to the Manhattan Project. The demand was desperate. In Carlisle, where quartz residue had been used to make sidewalks, local citizens busily dug them up, scavenging every bit of the precious crystal they could find. By December 1943, industry was working at breakneck speed to keep up.

The value of crystals became especially clear on D-Day. Underpinning the vast Allied armada that moved across the English Channel were thousands of different transmitters, all operating on myriad frequencies—separated by a hair's breadth from one another by means of quartz crystals. Without the slivers of quartz hidden away in the radios, the information that coordinated the movements of the different units in the great battle would have become an incoherent jumble of sound.

Because the United States successfully dominated the quartz trade with Brazil, source of the best crystals, the Germans had to make do with inferior bits and pieces of quartz for their radios—or go without. Clearly, though, they realized the importance of quartz. After the war, American experts, dispatched to interview Nazi scientists, discovered that they were well along with research on how to grow crystals artificially. Building on the work of German and U.S.

scientists, Bell Labs and other American groups began to culture crystals, in time so successfully that synthetic crystals came to be preferred by electronics manufacturers. Still, culturing requires natural quartz as a feedstock, and today—in part due to an attempt by Brazil in 1974 to control the quartz market—almost all American firms buy it from domestic mines.

"Like bejeweled caverns with the Seven Dwarfs"

The richest quartz deposits in North America are found in the Hot Springs, Arkansas, area which, predictably, is emerging as a Mecca for New Age crystal seekers. "People have wonderful expectations of what the mines will look like—like bejeweled caverns with the Seven Dwarfs," observes Serenity Peterson, of Nashville, Tennessee, who teaches workshops on the mystical qualities of quartz and is the author of *Crystal Visioning.* Actually, most of what comes out of the open-pit mines looks more like what you'd use to make a driveway than like something to raise consciousness or to guide a missile. But some beautiful pieces are found, and the plain white rocks are still needed to grow quartz for radios and computers.

"We get them in 100-pound bags," explains Joseph Balascio. "The crystalline structure is already in the rocks; our job is to transform them into bars that can be sawed and polished into wafers." The quartz from Arkansas is loaded into the bottom half of an autoclave, a giant tube-shaped pressure cooker. In the top half, hundreds of thin, quartz seed plates are hung in a cluster that looks like a high-tech chandelier. After an alkaline solution is pumped into the autoclave, it is sealed, and electric heaters below raise the temperature in the bottom half to 750 degrees F. The quartz dissolves and its elements, bonded to those of the solution, rise to the cooler seeds. As a result, particles are deposited on the seeds, and they grow in accord with the preordained lattice. It is a controlled, much-speeded-up imitation of what happens in nature. After 30 to 45 days, the autoclave is opened to reveal a rack full of glistening bricks of quartz crystals (pp. 82, 84). Even though he's done it hundreds of times, Balascio still loves to watch them come out. Each batch will yield tens of thousands of wafers. Using diamond saws, technicians cut the bricks into bars, which are then shipped to frequency-device manufacturers.

One of these is the McCoy Electronics Company, a few miles south of Carlisle. "We make oscillators and filters to cover the entire range of electronic frequencies," says Luther McCoy, the company's founder. "Our crystals have controlled circuits in Gemini, Apollo, Skylab, the shuttle and numerous other spacecraft." The first thing he shows you is a closet-size clock that is connected to one of the National Bureau of Standards atomic clocks in Boulder, Colorado. "The pulses we receive from there are precise within a few millionths of a second; we use them as a reference to tune our wafers up to 300 megahertz [300 million cycles per second]. But first the quartz bars we get from Motorola and other growers have to be sawed, ground, lapped, polished and etched into disks (pp. 88, 90) that are typically narrower and many times thinner than the nail on your little finger." Precision is crucial. For example, a ten megahertz crystal blank (one being cut to vibrate at ten million cycles per second) must be finished to within one thirty-millionth of an inch. Thus the products of many years of geothermal activity—and a few weeks in the autoclave—are rendered into jewels of electronics technology.

Of these, quartz wafers in clocks are no doubt the most common form—everything from wristwatches to the timekeeping circuits in computers and VCRs. A standard watch crystal oscillates at 32,768 cycles per second; a slower rate wouldn't be accurate enough; a faster one would wear down the battery too quickly. These oscillations are divided in half 15 times by step-down circuits in the watch so that they occur precisely once every second.

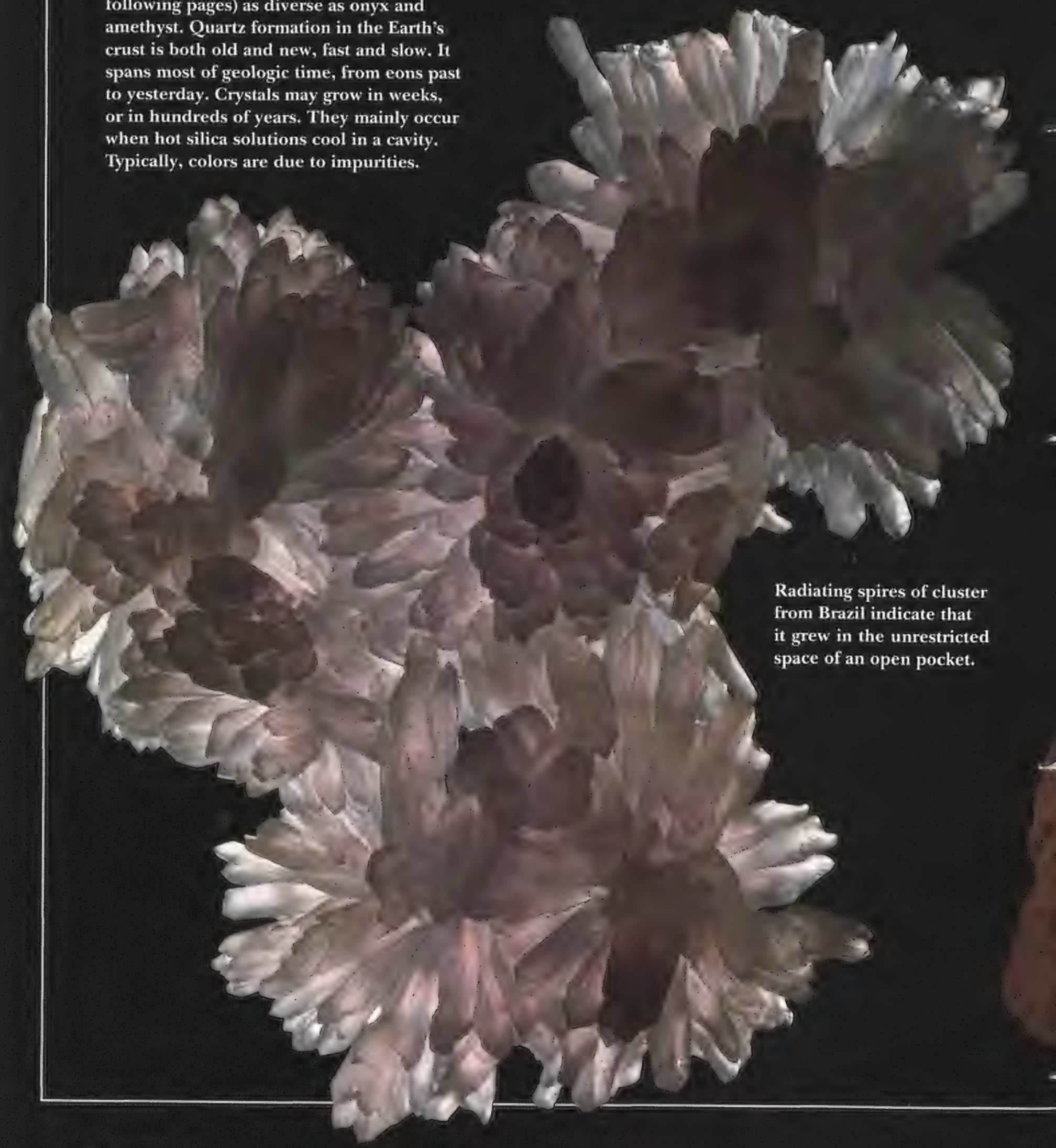
In addition to people, machines of many kinds also depend on quartz to keep time for them. Microprocessors, which employ crystals, have now replaced mechanical timers in many appliances, such as dishwashers. These little computers have also invaded the engine compartments of automobiles; they adjust the fuel and air mixture, and even provide mechanics with

Chemist Marcel Vogel claims he can rapidly age wine by pumping it around a "charged" quartz crystal.

Text continues on page 100

Varieties of quartz make a garden of earthly delights

Quartz, often thought of as a ho-hum milky mineral, in fact exists in a panoply of colors and shapes (shown here and on the following pages) as diverse as onyx and amethyst. Quartz formation in the Earth's crust is both old and new, fast and slow. It spans most of geologic time, from eons past to yesterday. Crystals may grow in weeks, or in hundreds of years. They mainly occur when hot silica solutions cool in a cavity. Typically, colors are due to impurities.



Radiating spires of cluster from Brazil indicate that it grew in the unrestricted space of an open pocket.

Volcanic agate nodules, found in Mexico, encapsule cavities in which dolphin-shaped, gray and white bands have formed.

Also volcanic, bright jasper, a finely grained form of quartz found in Utah canyon, exhibits core of softly undulating rings.

Spectacular rose quartz collar on smoky crystal was result of later growth in changed environment.

Canadian amethyst is coated by thin layer of rust-colored hematite, a form of iron oxide.

White band surrounding the cavity in this geode found in West Germany is quartz; black is hematite.

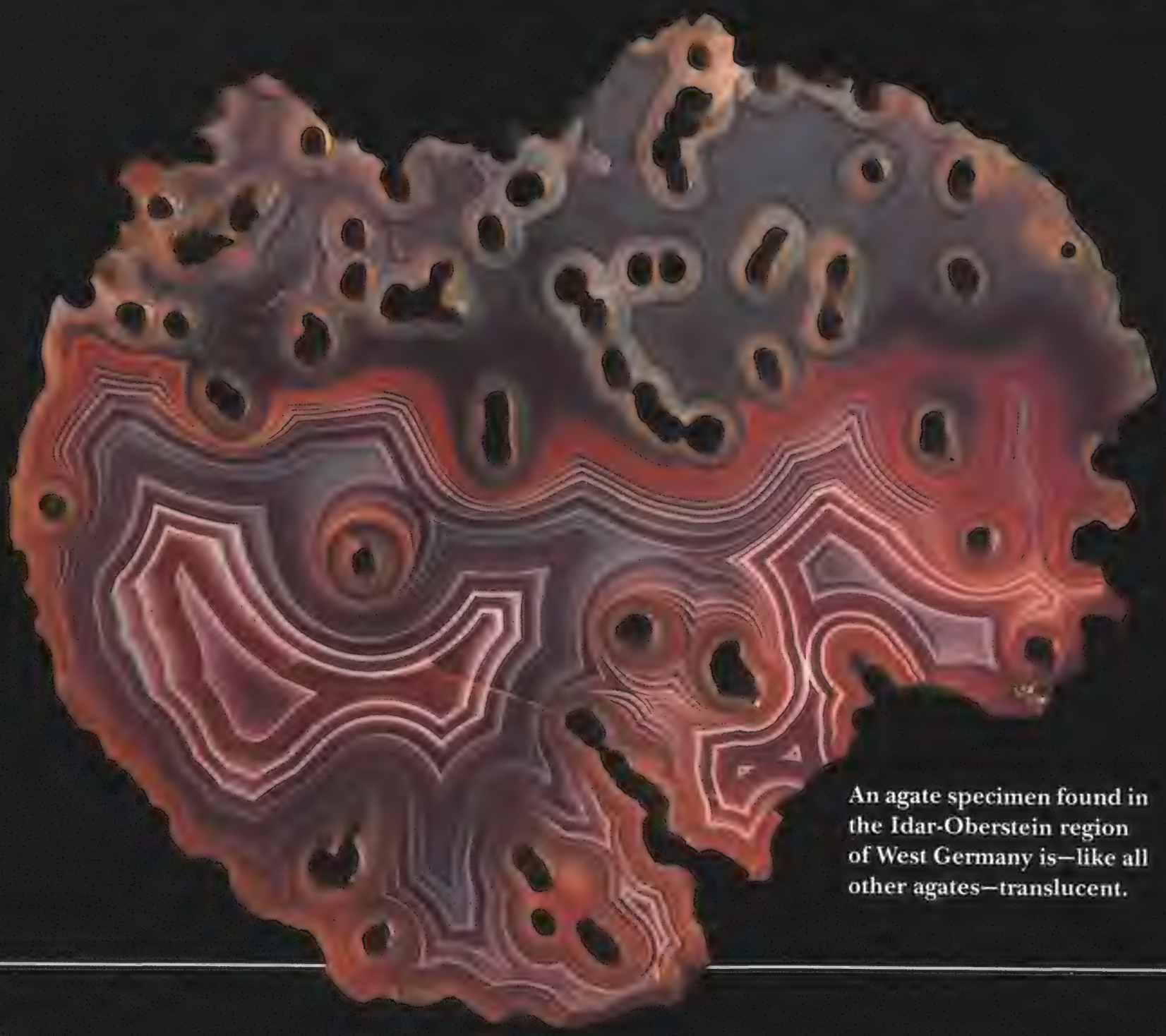
Bands at center of citrine from Brazil reflect successive changes in surroundings during the crystal's growth.

Fractured surface of this unusual Brazilian chalcedony probably mimics the texture of cavity in which it grew.

Hexagonal shape of amethyst prisms (characteristic of most quartz crystals) is seen in sparkling cluster from Mexico.

Green color of chrysoprase, a chalcedony in Silesia, is due to trace amounts of nickel.

Greater porosity of dark bands in Brazilian agate allowed staining by iron-rich water.



An agate specimen found in the Idar-Oberstein region of West Germany is—like all other agates—translucent.

A sliced and polished piece of petrified wood found in Australia shows how elaborately detailed patterns in the organic matter are reproduced as quartz replaces it; these resulted from wood's many worm burrows.

The Smithsonian's flawless 107-pound crystal ball, from Burmese quartz, is likely the world's largest.

an invaluable diagnostic tool by preserving an onboard record of how well the motor is doing.

Personal computers invariably contain quartz crystals. "It's impossible to do those logic and memory functions, and have streams of information flowing around inside the PC and arriving at the right place at the right time, if you don't have precise timing," says Bell Labs' Bob Laudise. "So whenever you have digital information it's very important to have a quartz clock."

All types of radios depend on quartz to control broadcast frequencies, as does television. The reds, blues and greens that make up your color picture have to be decoded by a circuit with a little quartz wafer called a colorburst crystal. Before it can be broadcast, the TV signals that carry color information have to be modulated (changed to a different frequency) so they don't interfere with the contrast part of the picture. By oscillating at 3.58 megahertz, the crystal in your set retrieves those color signals, which in turn trigger the pulses that light up your picture tube.

In addition to these applications, quartz and other piezoelectric materials such as piezopolymers enjoy a bright future in a variety of new technologies. Voice-recognition devices, which by the 21st century should permit you and your computer to talk to each other, employ crystals to slice verbal sound waves into pieces and turn them into numbers. The pen you use to endorse checks at the bank of the future may be piezoelectrically controlled. A quartz crystal will translate the unique vibrations of your handwriting movements into electrical memory. Someone else's hand vibrations in combination with your signature will alert the teller to a forgery.

All of this quartz magic can be easily explained by the theories of mainstream physics. But what about New Age claims that quartz crystals can heal the sick? Richard Gerber, a Livonia, Michigan, internist and author of *Vibrational Medicine*, is an enthusiast who believes there may well be more to crystal healing than just the placebo effect. "We know from Einsteinian theory that all matter is basically energy," he says. "So, the body is actually a complex system of energy fields. Quartz crystals apparently produce a subtle energy field that escapes measurement by traditional electromagnetic devices, but is nonetheless capable of influencing biological organisms." Indeed, after 14 years of research, retired IBM scientist Marcel Vogel, of San Jose, California, says that with charged quartz crystals he can change the pH value (acidity versus alkalinity) of water from five to eight and back again, and also reduce the time it takes to age wine from years to seconds, a process now being used experimentally by Sycamore Creek Vineyards in Morgan Hill, California. "I haven't seen reliable data yet, but the work is scientifically important," says William Tiller, a professor of materials science and engineering at Stanford. "Quartz has a very interesting structure, and I think eventually science will discover that it does have some ability to amplify subtle energies."

Many New Age claims for quartz, however, are nothing but pseudoscience. The supposed piezoelectrically generated energy field in the pyramid at Giza is an example. "True, the pressure of all those blocks would cause electric charges in the granite," explains Kurt Nassau, a Bell Labs crystal expert. "But the grains of quartz are randomly oriented, so there's no way you'd see the charges unifying into any kind of energy field." And, there is no established archaeological evidence that the Egyptians knew anything about piezoelectricity.

Engineer Balascio is amused at the thought that he and New Age crystal salvationists like Uma Silbey are colleagues in the quartz vibrations business. But he's enough of a scientist not to dismiss claims like hers until all the data are in. Still, for now, he's certain that she's a lot more likely to listen to one of his radios than he is to be healed by one of her earrings.

People at the Crystal Academy in Taos preach that crystals laid on the body activate healing energies.

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Photographs by Jean-Louis Dubois

In nuptial dress, snowy egrets are ethereal delights

Hunted nearly to extinction a century ago, these once-southern birds have now extended their breeding range north into Ontario

Far across a marsh, swatches of brilliant white rise up out of the grass, seemingly blown about by the wind, only to glide downward and disappear. Closer, along the water's edge, the white resolves into grave, graceful birds, heavy-billed hunters of the heron family, dressed entirely in a white as luminous as the layers of a wedding gown.

They hunt alone, wiggling their yellow feet in the water to startle fish, hopping about with wings raised, even diving into the water from the air. But these are social birds and they live in large, boisterous conglomerations in which shyness, meekness and humility are not valued. They roost together, they nest together, and when they are not hunting they spend a large part of their time trying to impress one another.

When an individual returns to the nest, it greets its mate or young with a flaring of the plumes on its head, neck and back into the diaphanous outline of a much larger bird. When two males dispute a display or nest area, they square off with head plumes erect and wings raised, stabbing at each other with their bills but rarely connecting. The young grow up in an atmosphere of ostentatious display worthy of a medieval court.

These are the snowy egrets, whose filmy plumes once doomed them to near extinction. A century ago,

In a full-dress encounter, two snowies display their plumes to each other at a South Carolina heronry.

With their feathers erect in aggressive display, the egrets thrust and parry in a bloodless fencing match.

fashion-conscious women began adding bird feathers to dresses, muffs, capes, fans and, most especially, to hats. Feathers and even whole birds became the rage: the ornithologist Frank M. Chapman reported that in a couple of afternoon walks on New York's Fifth Avenue, he had counted 40 recognizable species of "hat birds," including owls and crows. Estimates of the number of birds killed for the trade range upwards of five million a year. Snowies were a favorite. Hunters found them numerous and approachable, women considered their delicate plumes particularly appealing.

The cruelty did not go unnoticed. Henry C. Mercer (SMITHSONIAN, October 1988) had this to say in the *Bucks County Intelligencer* for February 3, 1897:

"With repeating rifles and guns chosen for the work, [the plume hunter] shot one by one ethereal parents, whose instinct brought them hovering back to the trees where their young cried from the nests, and their mates in wedding plumes lay bleeding. He tore the white feathers from their backs, heads and breasts, and threw the bleeding carcasses in heaps to the blow flies. Vultures hovered over the nestlings as their voices grew weak until they turned black in the sun, or their struggling forms fell from the treetops to confront his steps in the mud."

As more and more reports like this were published, reaction set in. Women wearing feathers were jeered at on the streets as those in wild furs sometimes are today. Queen Victoria decreed that military officers should no longer wear egret feathers in their hats. Fledgling

Lower egret defends its territory—and the female who appears in the last picture—from the interloper.

Audubon societies worked for legislation that would outlaw plume hunting. They hired their own wardens to enforce new laws, men who risked their lives for the lives of birds. In Flamingo, Florida, warden Guy Bradley stopped two hunters with illegal egrets. They shot him and set his body adrift in his boat. Warden Columbus G. McLoad disappeared in Placida, Florida; all that was ever found was his sunken boat and his hat—with two ax gashes.

The killing of birds did stop and remnant populations began to recover. The snowy egret rebounded during this century, extending its range far northward of where it had lived before the devastation, until now it breeds in Canada. (Other birds have not done so well. The reddish egret, for example, a slightly larger, rose-tinted cousin, still hangs on but is recovering at a much slower rate.) Today the snowy faces only the universal threat of its habitat being degraded or altogether lost. The present-day threat is not trivial. Biologists estimate that the population of wading birds—including snowy egrets—in south Florida is now only 10 percent of what it reached in the 1930s at the height of the post-hunting recovery.

We are the winners of the bird wars fought a hundred years ago. We can still go to marsh or shore and find one of these "white cranes" luring fish to a sudden end with its "golden slippers," turning aerial somersaults to attract favorable attention and, above all, fanning those magnificent plumes for anyone who will watch.
John P. Wiley jr.

A quick lunge and a small success as an egret comes up with a fish. Back at the nest the bird will regurgitate its catch, partly digested, for its young. Whenever the fishing is poor, nestlings can starve.

At left, egret on the nest fans its feathers in a threat display. It can be triggered by the approach of a bird, a photographer, or—for a second—its own mate. Opposite, bird in foreground begins similar display as second egret nears.

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BUCKLE UP FOR SAFETY.

By Phil Patton

Real America, where sky is blue and buildings run wild

With a camera and an eye for the bygone, the woebegone, the homemade, architectural photographer John Margolies rides again

Like an igloo with portholes, this is the general store, one of 15 structures in Flintstone's Bedrock City, devoted to Flintstone cartoons, at juncture of Routes 64 and 180, 40 miles northwest of Flagstaff.

It was barely 7 in the morning but already the sun was up over the firs, the fresh light bounding off the silver-scaled sides of the Fish Inn in Coeur d'Alene, Idaho. For the locals, it was just an ordinary morning, but it was one that John Margolies had dreamed of for years. The last time Margolies had been here looking at the inn, a 50-foot-long building in the shape of a gigantic muskellunge, it had rained. So Margolies, the nation's premier photographer and connoisseur of vernacular architecture, had waited, waited for another twist on the map of his wide travels to bring him back to this region of Idaho. He had waited for blue skies.

"I only photograph under blue skies," Margolies says. "I pick up the litter from in front of places and don't want any cars in the shot.

"I have a rap down now to get people to move their cars in 30 seconds flat, although sometimes I have to buy them drinks."

Mark Ferri

In his New York City apartment, John Margolies displays trophies from his many trips, including classic verse from Burma Shave, a soda fountain stool and a variety of signs that once adorned gas stations.

The man who captures real America

Yei-be-chei, Navajo dancer figure about 15 feet high, is one of a pair striding landscape near Grand Canyon.

Whatever the subject—whether a giant, rearing gorilla at Rawhide City in Mandan, North Dakota, the Vitrolite tiles of an Art Deco movie theater facade in Oregon, or the terra-cotta arabesques decorating an 1888 office building in Missoula, Montana—he must have those timeless, all-American, wide-open, happy, postcard-blue skies. No wonder he is so preoccupied with the weather that he tunes in constantly to the weather channel and has considerable knowledge of local climates throughout much of the United States.

Some people are obsessed with collecting Louis XIV furniture, others with beer cans or butterflies. John Margolies is obsessed with the architectural flora and fauna of American main streets, roadsides, movie theaters and resort areas—the exotic, improvisational, outrageous furnishings of the great open spaces. In the process he has helped preserve a portion of our common heritage by documenting thousands of buildings, many of them just months or even days before the bulldozers were to carry them away for good. The fruits of his labors have been displayed in numerous museums and gallery shows, and in several magazines and books, from last year's *Miniature Golf* (SMITHSONIAN, June 1987) to *Lost America postcards* to *The End of the Road*, an array of his favorite vanishing roadside buildings, to *Resorts of the Catskills*, about classic 19th- and 20th-century hotels.

Margolies had been planning this trip for some time: a swing west, through Iowa into the Dakotas, to the Northwest and down into California. Dancing constantly in his head is a series of maps of places he has yet to cover and places he wants to return to. "I need to work in Wisconsin," he might say. "The last time I was badly rained out there." Or "I need the Dakotas, where I'm very weak." Always, he is assembling and editing a list of places he wants to cover.

He had begun this trip, as he does every year, the day after Labor Day, when the summer tourists are back at work and school, and the skies are still blue. On his trips, he rents the "biggest, most comfortable and foam-padded American car" he can find and tunes the radio to the Top 40.

"Wow! What a great country this is!"

The sun not yet up, and the streets of Manhattan, where he lives, still almost empty, he loaded up the car with the Fred Flintstone nightlight on a 20-foot extension cord that he uses to illumine alien motel bathrooms, and the folding bed board he carries to fend off the vagaries of motel mattresses. He packed his camera and film, his traveling coffee mug and maps. He headed west, feeling better as he got out of town, feeling a familiar surge of emotion as the towers of Manhattan faded into the distance behind him.

Fame of the Corn Palace in Mitchell, South Dakota, has spread worldwide. Centerpiece of the annual corn harvest festival, held every year since 1892, the building is festooned with corn, grains and grasses.

"There is always a moment," he confesses, "when I begin a trip and get outside of New York City into the real America, and the fields and forests start to appear, when I suddenly think, Wow! What a great country this is!"

It is a revealing statement. I have admired Margolies' work ever since I first leafed through *The End of the Road*, with its nostalgic views: a café sign with a perfect waitress bearing a perfect milkshake in front of a background of perfect fir trees; the backs of old drive-in movie screens, whose images have faded to the soft tones of frescoes.

But meeting Margolies and spending some time with him, one senses that along with a straightforward, unsentimental approach to his subject is a streak of old-fashioned patriotism. Underneath, John Margolies is a romantic.

On the road, he spent the first night in Youngstown, Ohio. Then he drove for two days and on the fourth morning, getting warmed up, he photographed a giant statue of Pocahontas in Pocahontas, Iowa (p. 119).

The Corn Palace in Mitchell, South Dakota, had been his long-planned first destination. The annual decoration of this huge building with corn ears and stalks, grasses, grains and seeds is part of a tradition that goes back to 1892. This year the theme is fraternal organizations, and the heraldry of Elks and Shriners combined with that of the corn provides a wealth of visual images (above).

Since 1979, he has made eight major trips, most of them lasting two months or so, seeking out the unmonumental, the vernacular, the playful, the crazy, the fantastic in architecture. Appreciation of this side of American building and design has never been greater, and Margolies is one of the prophets who has brought it to wider attention. "This is a forgotten portion of the great American architectural heritage," said architect Philip Johnson, who was an early financial as well as spiritual supporter of Margolies' work, "and John Margolies is perhaps the leading historian in this field." The architecture critic Paul Goldberger called him "the father of this entire movement." He counts among

Phil Patton has written on architectural recycling, baseball bats, motels, skyscrapers and Machine Age art—in the November 1986 issue of SMITHSONIAN.

On Highway 99, near San Joaquin Valley, was an ice-treats stand imitating a traditional Dutch windmill.

Fine Arts Building that decorates fairgrounds of Great Falls, Montana, has ornament of Art Deco style.

other fans Frank Gehry, who has designed a Tokyo building, furniture, lamps and sculpture—all inspired by fish (SMITHSONIAN, April 1987).

Margolies now has more than 100,000 slides, stored in three different locations for safety's sake. He lectures and shows these slides frequently, and serves as an informal consultant for groups attempting to save older commercial buildings from destruction. Not long ago, for instance, he lent support to an effort to persuade the owner not to destroy a lovely, streamlined, white-and-cobalt-blue-paneled gas station in New Hartford, New York, that was part of the Sears Oil chain in that state. The structure boasted a "lubritorium" in red letters, and windows shaped like the cross-section of a pharmacist's prescription capsule. Margolies joined Barton Rasmus of the Landmarks Society of Greater Utica and others in the attempt to save it. This time, as so often, the endeavor was a failure, despite the fact that the building's virtues were trumpeted as far abroad as the pages of the *International Herald Tribune*. But people are beginning to understand: 17 service stations are now on the National Register of Historic Places.

In Grassy Butte, North Dakota, he lost a wheel-bearing cup, which the Ford dealer replaced at no charge. The man also told Margolies about a miniature golf course on the edge of town. It turned out to be a jewel, created by a local artist named Lucy Cork.

In the Dakotas and Montana, a great many small-town banks have been turned into bars—this is the kind of place Margolies notices and photographs. In north-central North Dakota, he took a picture of a sign that marks the official geographic center of the North American continent. In Whitefish, Montana, he photographed a piece of surplus rolling stock converted to a souvenir and gift shop called the Caboose. An annex is known as the Loose Caboose (p. 119). In the next town he found a set of letters from a sign that had marked one of the Texaco stations designed by Walter Dorwin Teague; Margolies bought the set for $15.

His small apartment in Manhattan is packed with signs, postcards and other items picked up in his travels. In the living room a large Mobil Flying Red Horse sails above a flock of soda pop signs—7-Up, Pepsi, Squirt, Delaware Punch and Nehi, to be sure, but also rarities of the past: Botl'o, B-1, Rainbow, Mt. Cabin, all in shiny enamel on tin. A recently acquired prize hangs from the ceiling. It is a complete sequence of Burma Shave signs: "Lettuce Suppose/You Know/Your Onions/Don't Turnip Your Nose/This Beets 'em All/ Burma Shave."

There is also a set of rotating display racks laden with postcards, some of them reflecting Margolies' lat-

Designed by Cottier and Herrington, 1938, as a Public Works Administration project, it is still in use today.

Service stations have come in many guises, but Teapot Dome, near Zillah, Washington, may take the prize.

est interest, "large letter" cards that carry the names of localities in huge, shadowed letters. "I have 80 percent of them," he says gleefully, referring to a catalog of all the available cards, published by an equally avid collector. "Perfect clichés," he says approvingly. Another example of Margolies' taste in roadside Americana is the DeKalb corn sign—which features an ear of corn with wings. As a matter of fact, you get the impression that if he could fit a building into the back of the big cars he rents and bring it home to New York, he would quickly have a whole town.

In Great Falls, Montana, Margolies dropped one of his cameras—a potential catastrophe. (He uses a standard 50-millimeter lens, nothing fancy.) After a stop at a nearby camera store, whose proprietor assured him nothing was broken, he documented a streamlined bus station (p. 121), a 1930s Public Works Administration building (above) and a wonderful miniature golf course run by Robert and Estella Petrini. At first when he asked to photograph it, the Petrinis were suspicious. Even now that Margolies carries with him copies of his miniature golf book, bound in a distinctive Astroturf-like cover, it is hard for proprietors of the courses to believe that anyone would be interested in photographing their fairways, windmills, lighthouses and Chinese pagodas. Finally, the Petrinis understood, warmed up and even invited him to dinner. It was the only home-cooked meal Margolies was to have in almost two months on the road.

Margolies is an heir to a longstanding tradition. In one sense, he does as a private citizen, albeit with regular support from the Guggenheim Foundation and the National Endowment for the Arts, what the Historic American Buildings Survey, the Farm Security Administration and other New Deal agencies did more formally: record the diversity of American architecture before it vanishes.

He is also working in the tradition of Walt Whitman, who hailed the works of the common man; and of Henry Ford, who assembled buildings, machines and other artifacts at Greenfield Village with the conviction that he was preserving the history of the American people as made by their own hands, and with the firm belief that "you can read an object like a book if you know how."

To those who consider what he photographs, collects and seeks to preserve as crude and untutored—as simply bad taste—Margolies has a ready reply: "What's bad taste is what's bland." Today, he says, roadside restaurants and motels "are vanishing into thin air. They don't have to look like anything. When Holiday Inn has become an 800 number, you miss the old Holiday Inn sign. When McDonald's is a series of

No longer in use but still cherished, old city jail of Frederick, South Dakota, stores lengths of water main.

cutesy television commercials, you miss the giant arches of the original."

While architectural history has concentrated on the monumental, the large and the unique—the cathedral as opposed to the garage, in one summation—Margolies seeks to remedy the balance in favor of the latter. "We have the cathedrals," he likes to say, "but what about the people who built them? What wouldn't we give to know how Joe Blow—the average man—lived in the age of the cathedrals?"

From Idaho, leaving Coeur d'Alene and the Fish Inn, Margolies crossed into Opportunity—a little town on the other side of the Washington state line. In Washington, he visited the Teapot Dome Service Station, a 1920s creation in the shape of a teapot; it is one of the buildings on the National Register. Then he drove on to Bend, Oregon, and made a great discovery nearby: Petersen Rock Gardens, the construction of an eccentric man named Rasmus Petersen who built this array of bizarre rock sculptures from 1935-52. "Enjoy yourself, It is later than you think" is the cryptic inscription on one of them.

In Klamath Falls was the Rock-wood Motel, a structure composed of petrified wood, along with obsidian, amethyst and other minerals.

Margolies grew up in New Canaan, Connecticut, then attended the University of Pennsylvania, where he studied journalism and art history, earning a B.A. in 1962. Moving on to Penn's Annenberg School of Communications, Margolies took a course with Gilbert Seldes, a champion—but a respectable champion—of American popular culture, which Seldes charted in his book *The 7 Lively Arts.* Margolies graduated in 1964 with an M.A. in communications. He became an assistant editor at *Architectural Record* and program director for the Architectural League of New York.

It was in 1970 that Margolies began to get people upset. While associated with the Architectural League, he found himself at the center of a major controversy when he mounted a show of work by Morris Lapidus, the architect best known for his gaudy, Hollywood-set hotels, such as the Fontainebleau and Eden Roc in Miami Beach. Photographs of the buildings, accompanied by appropriate, easy-listening music, outraged contemporary architects and most critics. Ada Louise Huxtable of the *New York Times* tried to be evenhanded, but hardly choked down her disgust.

This assault on conventional taste was followed by an article in *Progressive Architecture* in praise of the Madonna Inn in San Luis Obispo, California, the well-known garish honeymoon palace where every room is outfitted by theme: stone, redwood and grotto rooms, the Cloud Nine room, the Victorian Gardens room, Daisy Mae and Caveman rooms—109 different ones in all, a number with rock-lined "grotto" bathrooms.

The times were a-changin', but modernism still held sway. Robert Venturi was about to publish *Learning from Las Vegas,* in which he contended that popular architecture could be a source of imagery and symbolism for "high architects." But Margolies went much further. "Venturi said it was OK to learn from this to make the real thing. I said this *was* the real thing."

Leaving the controversy behind, Margolies moved to Los Angeles. He put together a show of slides and videotapes called "The Television Environment," an effort at tracing the history and effects of television, and exhibited it at several art museums nationwide.

Those stopless childhood outings

Not until 1979 did he take to the road in earnest. He saw the architecture of the highway and resort beginning to vanish, and realized how much he liked it—and how important it was. The decision marked the resumption of a personal fascination that dated back to the early '50s. As a child he would ride in the backseat of his parents' car in outings along the Berlin Turnpike, which runs between New Canaan and Hartford, and marvel at all the wonderful roadside enterprises. But his parents, he recalls, never stopped at any of them (amateur psychologists take note).

Margolies has always been fond of dinosaurs and other extinct animals, and they have plenty of sculptural monuments. But in Chiloquin, Oregon, he discovered Thunderbeast Park, where extinct mammals—mammoths and saber-toothed tigers and giant sloths—finally get their due. The huge, lifelike con-

Pocahontas, 25 feet tall, stands on Highway 3 to announce the town of Pocahontas, Iowa, and a tepee gift shop.

About 40 miles north of Klamath Falls, Oregon, there prowls a replica of baluchitherium, a relative of rhinoceros.

Tower of Fox movie theater, closed now, is Missoula, Montana, landmark.

Old gas station sign, pure Americana, adorns post in Drake, North Dakota.

Called the Loose Caboose, this structure is not a caboose at all, but a gift-shop annex in Whitefish, Montana.

A monument to another time, the Tower Theater, Klamath Falls, Oregon, closed down in February.

crete figures are re-creations of animals that at one time roamed there.

On down the road past Fresno is Bakersfield, home of Deschwanden's Shoe Repairing, the shoe-shaped shoe shop, legendary among connoisseurs of vernacular architecture. Margolies had waited ten years to reach Bakersfield, Merle Haggard's hometown, under blue skies. But he was growing tired from too long on the road. Barstow, California, then St. George, Utah; Cedar City and Zion National Park whizzed by.

Jaded now, he looked at the Grand Canyon "for about one second." But 30 miles south, he photographed a tourist attraction, Flintstone's Bedrock City. The skies were no longer pure blue. Finally, near Sedona, he gave up on the weather. Gray-white clouds obscured the usually open skies of the Southwest—the reverse of the fine weather he'd had in the less dependable Northwest. Those blue skies, he felt guiltily, had been paid for by the farmers whose maturing crops were suffering through a drought.

Back along the track of Route 66: Albuquerque and Tucumcari, New Mexico; Elk City, Oklahoma; Russellville, Arkansas. He detoured through Jonesboro, Tennessee, past Knoxville, and photographed the It'll Do Motel, which wouldn't do, and an excellent beauty parlor, now a gift shop—another of his fascinations. Two stops more and he was home—58 days, 11,945 miles and 238 rolls of film after he began.

A few months later, I drove with Margolies back to the Berlin Turnpike. It is much changed from the days of his childhood, when this strip was as teeming with life as a Pacific tide pool. Then, it was "Gasoline Alley," site of high-octane price wars and locale of restaurants and motels. Now the traffic has shifted to the superhighways, the tide receded.

We rode up the Merritt Parkway—"Every bridge on the parkway is different," he noted approvingly—passing within a few hundred feet of the 1860s farmhouse where he grew up. After stopping to refill our convenience-store coffee cups at a diner Margolies knew—a sleek, shiny metal structure hidden now by boxy, glass office buildings—we eased onto what was left of the Berlin Turnpike strip.

The original arched McDonald's had been replaced by a standardized, mansard-roofed one; several diners had vanished altogether. But a number of the motels were still in business, and of the two huge drive-in theater screens he remembered, one was miraculously still operating; the other was a rusty hulk, visible far off among the trees.

He talked about how difficult it is to preserve this sort of architecture. It is not like the old courthouses or train stations in downtown areas, which can be converted to other uses. Out on the strip, it is different. "You see, there's nobody here," he said.

But there were also encouraging signs of new growth: two brand-new miniature golf courses. It was an early spring day and to Margolies, piling eagerly out of the car for an inspection, the sight of two courses was like the discovery of the first daffodils.

"That's one of the stories of my life," he had said as we were driving along the Merritt early that morning, heading against the thick traffic of commuters, "always going the other direction. Being where they ain't.

"I don't want to be ahead of my time," he added, looking at the tightly packed schools of cars across the barrier, "I want to be in sync with it. Now, I feel my time has come. If you stick to something long enough, the public will catch up."

Our side of the parkway was clear. Under blue skies, we sailed ahead.

Bus terminals like this in Great Falls, Montana, pure Art Deco, are disappearing from the landscape.

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BUS DEPOT

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By Louis Phillips

'Yours, not sitting on a pumpkin'

January 6, 1846
Dear Mr. Trump:

Thank you for your recent letter in which you express interest in purchasing my house for the purpose of tearing it down and building a 36-story hotel and gambling casino tentatively called THE WALDEN TRUMP CARD.

May I just point out that since we last conversed on the subject I shingled the sides of my house, which were already impervious to rain, with shingles made of the first slice of the log, whose edges I was obliged to straighten.

I hope you will keep such improvements in mind when making your bid.
Cordially, Henry David Thoreau

January 11
Dear Mr. Thoreau:

Indeed my corporation will take into consideration anything you wish. However, what does *impervious* mean?
Yours in haste, Donald Trump

January 14
Dear Mr. Trump:

Impervious *adj*: Not to be pervious. Or to be pervious at one's whim. Forgive me for resorting to the dictionary. It is as we both know a last resort. Last Resort—would that not be a good name for one of your pleasure palaces?

The other morning I received three dispatches (brought to me by a hound, a bay horse and a turtledove) from your lawyers. Your agents have inquired about the exact cost of my house. I give details because very few are able to tell exactly what their houses cost, and fewer still, if any, the separate cost of the various materials that compose it:

Boards $8.03½
(mostly shanty boards)
Refuse shingles for roof and sides 4.00
Laths 1.25
Two secondhand windows with glass 2.43
One thousand old bricks 4.00
Two casks of lime 2.40
(that was high)
Hair 0.31
(more than I needed)
Mantle-tree iron 0.15
Nails 3.90
Hinges and screws 0.14
Latch 0.10
Chalk 0.01
Transportation 1.40
(I carried a good part on my back)
In all $28.12½
Yours in leisure, Henry Thoreau

February 3
Dear Mr. Thoreau:

Happy Groundhog's Day or thereabouts. My representatives and I wish to thank you for your candor. You are correct in pointing out that the cost for the lime was high. In future, I hope you will allow me to buy it for you wholesale.

Frankly, the mention of hair left us a bit perplexed. It strikes us as unsanitary and we believe it will cause problems with local health authorities.

While I think of it, please do not carry boards upon your back. A strong back is necessary to an essayist. I will put you in touch with the Fugazy service whose stretch limousines provide a television set and private bar. Once the neighbors see you in a stretch limousine, your work will earn a new respect.

My lawyers will contact you in a few days about a preliminary bid. In the meantime I remain, Financially secure,
Donald Trump

"We have not discussed the furnishings to my dwelling. They consist of a bed, a table, a desk, three chairs, a looking glass three inches in diameter . . . three plates, one cup, one spoon, a jug for oil and a japanned lamp."

February 12
Dear Mr. Trump:

Thank you for yours of February 3d.

Your representatives have been in touch with me. I must say that your offer of $14,789,000 is quite tempting. It does represent a substantial increase over my original investment.

I should like to point out that last year I made $23.44 by selling farm produce. I also earned by day labor $13.34. I hope you will take these figures into consideration when revising your offer. Sincerely, Henry

February 20
Dear Henry Thoreau:

You *are* a Yankee. $17,500,000 is as high as I am prepared to go. After all, even you must admit that Walden is no Monte Carlo. Sincerely, Donald

March 1
Dear Donald:

I am not an extravagant man, and I am certain that $17,500,000 would make it possible for me to survive two or three years as a Concord gentleman. I could also publish another edition of my book, since so-called commercial publishers want no part of it.

However, we have not discussed the furnishings to my dwelling. They consist of a bed, a table, a desk, three chairs, a looking glass three inches in diameter, a pair of tongs and andirons, a kettle, a skillet and a frying-pan, a dipper, a wash-bowl, two knives and forks, three plates, one cup, one spoon, a jug for oil and a japanned lamp.
Yours, not sitting on a pumpkin,

Henry

March 8
Dear Hank:

Is there anything else we should know?
Yours (I don't sit on pumpkins either),

Don

March 15
Dear Don:
My nearest neighbor is a mile distant, and no house is visible from any place but the hill-tops within half a mile of my own. That should be worth something.
Take your time, Hank

March 26
Dear Hank:

We'll throw in $340,000 for the furnishings and $500,000 for the view. For God's sake, man, stop being so stubborn. We would like you out by June 15 at the latest. Yours, D.T.

May 2
Dear DT:

Your offer is most tempting, especially since last year I turned a pecuniary profit of $8.71½.

However, a lady once offered me a mat, but as I had no room to spare within the house, nor time to spare within or without to shake it, I declined it, preferring to wipe my feet on the sod before my door. It is best to avoid the beginnings of evil.
Yours, HDT

June 1
Dear HDT:

You have delayed the construction of my proposed casino far too long. Just what game are you playing? It is obvious to everyone you cannot make a decent living from your writing or your farming. Just what trade are you in?
Yours, Donald Trump

"You have delayed construction of my proposed casino far too long. Just what game are you playing? It is obvious you cannot make a decent living from your writing or farming."

June 13
Dear Donald Trump:

I have as many trades as fingers.
Yours, Henry Thoreau

June 21
Dear Mr. Thoreau:

I believe it. Sincerely,

Donald Trump

P.S. By any chance are you a friend of Mayor Koch? Or Mort Zuckerman?

July 1
Dear Mr. Trump:

No, I have no acquaintance of the gentlemen you mentioned. I never knew, and never shall know, a worse man than myself. Sincerely,

Henry David Thoreau

January 3, 1847
Dear Mr. Thoreau:

I can imagine that winters at Walden must be no picnic. My new partners and I are prepared to offer you $21,000,000 for that shanty of yours, but we must have a response within three days of your receipt of this certified letter.
Yours, Donald Trump

January 6
Dear Mr. Trump:

After a winter night I awoke with the impression that some question had been put to me, which I had been endeavoring in vain to answer in my sleep.

I hereby decline your offer of $21,000,000 for my cottage and acreage. You have not taken into account that I have all of Walden Pond for a well. This is valuable as it keeps butter cool.
Yours, Henry David Thoreau

January 12
Dear Mr. Thoreau:

Please do not lecture me about the value of things. Make the new offer $22,000,000. You have three more days.
Yours, Donald Trump and Co.

February 3
Dear Sir:

Time is but the stream I go a-fishing in. Yours,
[This letter was unsigned.]

February 7
What does that mean?

Trump Corporation

February 27
Dear Mr. Corporation:

I have no idea. But I thank you for your letters. To speak critically, I never received more than one or two letters in my life that were worth the postage. Your postage bills must be enormous.
Yours, Henry D. Thoreau

[The following letter was undated and unsigned.]
$35,000,000. Is that worth the postage?

March 13
Dear Sirs:
[Alas, Thoreau's reply, written in ink, was obliterated by rain that leaked through the ceiling of his cottage. The best we can make out is that it made some mention of a japanned lamp.]

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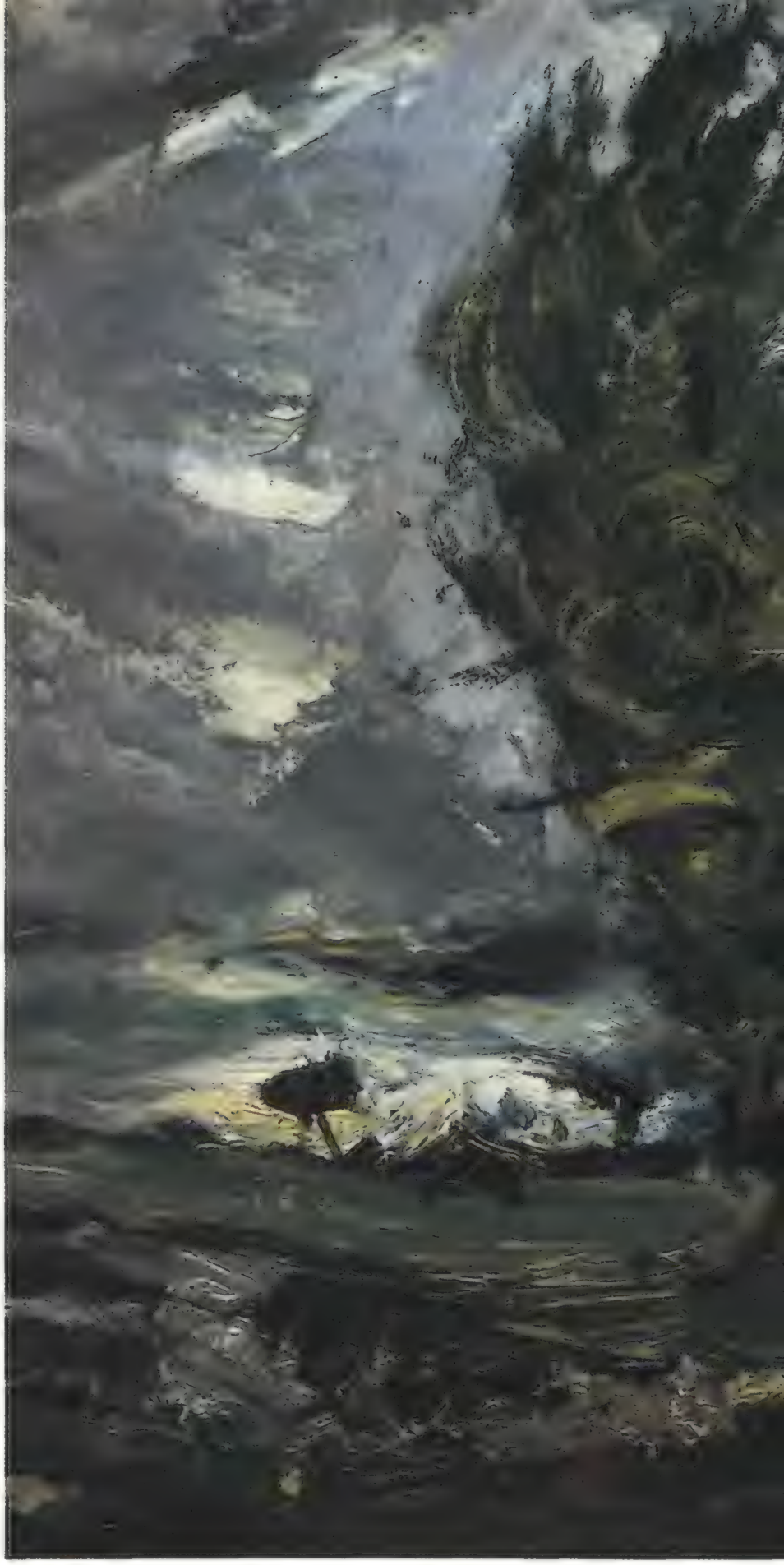
By Stanley Meisler

Soutine: the power and the fury of an eccentric genius

Isolated and tormented, he once said that he was going to murder his paintings, but fortunately they are still with us



Chaim Soutine painted landscapes with passionate intensity. His *Windy Day, Auxerre* was done in 1939.

When I graduated from the City College of New York in 1952, my Uncle Morris had a heart-to-heart talk with me. He told me to work hard, get a steady job and not spend the rest of my life struggling in a Paris garret like his cousin Soutine. "Chaim Soutine, the painter?" I asked. "You mean you've heard of him?" replied Uncle Morris.

My late Uncle Morris' ignorance might seem inexcusable. By 1952, Soutine's paintings graced the collections of the Phillips Gallery in Washington, the Museum of Modern Art (MOMA) in New York, the Chicago Art Institute and other museums throughout the United States. MOMA and the Cleveland Museum of Art had recently mounted a major retrospective of his work. His reputation had been set in the art world for many years. Amedeo Modigliani had painted four portraits of Soutine as a young man and pronounced him a "great painter." Albert Barnes, the American doctor and art collector who had developed and marketed the popular antiseptic Argyrol, becoming immensely wealthy as a result (*Book reviews*, May 1988), insured Soutine's success by buying a batch of paintings in one swoop in 1922. Soutine looked uncouth and tattered most of his life, but he was a highly regarded Expressionist painter when he died in Paris in 1943 at the age of 49.

Yet it is also true that the life and work of Soutine have long seemed somewhat obscure, especially in the United States. Postwar American books on Soutine leave great gaps in his life. He is probably best known to general readers as a strange, taciturn character who sometimes pops up in the biographies of the wild and tragic Modigliani.

It has taken a stay of several years in Paris for me to truly discover Soutine. A visitor can still see the house in which he lived with other struggling artists like Fernand Léger, and the small apartment building at 18, Villa Seurat where he did much of his later work.. An admirer can still meet an old friend of Soutine's

Phillips Collection, Washington, D.C.

It was just before the Nazis invaded France. Peasants, seeing him at work, said "that really is our land."

like 94-year-old Mme. Madeleine Castaing and look at her rarely exhibited Soutines. A statue of him—short, squat, a hat slouched over his eyes, hands deep in the pockets of a long winter coat—stands in Gaston-Baty Square not far from his favorite cafés of Montparnasse. And a visitor to the Musée de l'Orangerie, the French national museum in the Tuileries Gardens off the Place de la Concorde, will feel the power and fury of Soutine like nowhere else on Earth.

The Orangerie houses the extraordinary modern collection of art dealer Paul Guillaume, expanded later by his widow and her second husband. Soutine introduces the collection to the public, for the curving main staircase of the Orangerie leads into a phenomenal Soutine space, with 22 of his paintings hanging on the four walls that surround the top of the stairs. All of Soutine is represented: the portraits of tense and tormented people; the wondrous, brightly colored land-

Happy, for once, at his work, Soutine smiles next to model, a dead rooster, in Paris studio around 1925.

scapes; the strange still lifes of plucked game and slabs of beef. The landscapes are a special revelation; there is nothing pastoral and quiet about them. On my first visit, a series of five landscapes along one wall seemed to pull me relentlessly across them, as if I were caught in a whip, lashing me from one painting to another. I could understand the old joke of Modigliani describing his own drunkenness: "Everything dances around me as in a landscape by Soutine."

Chaim Soutine, an awkward, timid, poor student from czarist Russia, arrived in Paris in 1913 at the age of 19, with only a few rubles in his pocket. He was the next to last of 11 children of a Jewish tailor living in the village of Smilovichi just outside Minsk (now in Belorussia), and had studied at the School of Fine Arts in Vilna, Lithuania.

Like many another poor artist then and now, Soutine took refuge in Paris, at first in La Ruche (The Beehive), a rotund residence on the Left Bank decorated with ornate sculpture. La Ruche, financed by wealthy contributors, offered work space and apartments at low rent to painters and writers. Its tenants of that era included Marc Chagall, Fernand Léger, and the Swiss poet and novelist Blaise Cendrars. Soutine moved into La Ruche with a classmate from Vilna and enrolled in the Ecole des Beaux-Arts.

An innocent bumpkin in a big town

Though part of the bohemian crowd, Soutine, in those days, also had the look and manner of a perpetual outsider, barely speaking French, poorly educated, an innocent bumpkin in the big town, unwashed, frightened of women, shy of everyone, saying little yet quick to anger. Despite his youth, he already had started to feel the pain of an ulcer in his stomach. It was hard to imagine him as a friend of the urbane, educated, flamboyant Modigliani. In 1915, however, the sculptor Jacques Lipchitz, who also had studied in Vilna, introduced them, and Soutine soon became one of the companions of Modigliani as the Italian roamed Montparnasse in the evenings, offering to sketch portraits on the terraces in exchange for drinks.

Modigliani drew and painted his friend several times. His 1917 portrait of Soutine in the National Gallery of Art in Washington reflects all the fear and awkwardness in a coarse-looking young man. His shirt is askew, his hair unkempt. But the portrait also reveals a Soutine of quiet gentleness, his artistic hands in repose. Modigliani flattered and encouraged Soutine as a painter, polished his manners a little, and tempted him into a torrent of drunken binges. Yet Soutine always remained somehow apart from those who dominated the artistic world of Montparnasse. The dignified Mme. Lunia Czechowska, who sat for one of Modiglia-

National Gallery of Art

Modigliani, as close to a friend as Soutine ever had, painted this portrait of him, one of four, in 1917.

Musées de la Ville de Paris

Soutine flattered no one, and was especially hard on this model—himself. He entitled it *Grotesque.*

ni's best-known portraits, said years later, "Soutine was never really part of the group. He kept himself hidden in a corner, like a frightened animal."

Modigliani died in a Paris hospital in January 1920 at the age of 35, suffering from a failing kidney and tuberculosis, his condition aggravated by his alcoholism. "Don't worry," he told his friend and dealer, the Polish poet Léopold Zborowski, "in Soutine, I am leaving you a man of genius." Soutine received the news of Modigliani's death while painting on the Côte d'Azur. The loss devastated him and shocked him into limiting his drinking from then on.

Modigliani had regarded Soutine as a genius, but few others did. Like most of the young painters working in Paris in those days, Soutine was largely unrecognized and unsold. That changed suddenly in 1922 when Albert Barnes arrived in Paris intent on using his Argyrol profits to augment his art collection in a huge way. Barnes noticed a Soutine portrait of a pastry chef in the gallery of the young dealer Paul Guillaume on the fashionable Rue du Faubourg St.-Honoré. "It's a peach," the doctor said. Guillaume, whose English was weak, did not understand the expression. No, he disagreed, it was a pastry chef. Barnes demanded to see more. Guillaume led him that night to the home of Zborowski on the Left Bank near the Luxembourg Gardens. Barnes bought every Soutine he could find there, including five that Soutine had intended to burn.

Barnes wanted to meet the artist and returned to Zborowski's the next morning to do so. The dealer went to Soutine's, woke him up and made him put on his best clothes, then led him back to the waiting

Barnes. The meeting between the rich, cantankerous collector and the impoverished, shy painter was not a happy one. "Barnes was seated, looking at me, and said, 'Ah, it's Soutine. Good,' " Soutine reported years later. "A boor! I will never forgive myself for having been idiot enough to go to such trouble." Later, Barnes spoke contemptuously of his find: "I caught him when he was drunk, sick and broke," he said, "and took the contents of his studio for a pittance." But Barnes always prided himself on his discovery. The doctor had bought many Renoirs, Cézannes, Matisses, Picassos and Modiglianis—now exhibited with the Soutines in the gallery of the Barnes Foundation in Merion, Pennsylvania, outside Philadelphia—but Soutine was the only totally unknown artist that he had discovered.

News of the Barnes purchases reached the cafés of Montparnasse quickly. Everyone talked of the good fortune of the 29-year-old Russian. Soutine suddenly found himself a celebrated painter. A little more than a year later, Zborowski began to sell Soutines regularly at good prices to other collectors. For a while, Soutine spent his new income lavishly, even taking lessons in French diction to rid himself of his Yiddish accent. But the excitement of a steady income soon palled and Soutine slipped back to his old, frugal ways. From then on, photographs usually show him in well-worn jackets and sweaters.

By all accounts, Soutine always painted in a kind of frenzy, laying his bright colors on thickly, hardly pausing to think. "Soutine painted rapidly," his friend, the sculptor Chana Orloff, recalled. "He nurtured his idea for several months and then, when ready, started the painting in fury. He worked with passion, with fever, in a trance, sometimes to the music of some Bach fugue that he played on a phonograph. Once he finished the painting, he was weak, depressed, wiped out."

Soutine had a strange ambivalence toward his own work. As a young man, he showed his paintings to a friend and said, "All that you see here is not worth anything. It is crap, even if it is better than the paintings of Modigliani and Chagall. . . . Someday I am going to murder my paintings—although these are too contemptible even for that." Later, he had no such hesitation. If his work displeased him, he would run into the kitchen, pick up a knife and slash at the canvas. Sometimes he would burn the ripped painting as well. Zborowski routinely removed paintings from Soutine's to save them from destruction. When he had

Both: Musée de l'Orangerie, Paris

Called a "servant painter," Soutine liked to search out everyday people, such as a clownlike pastry cook.

Soutine painted a disheveled, sad-eyed room service waiter after a stay at a hotel near Vichy in 1927.

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Albright-Knox Art Gallery, Buffalo

Stark, gory *Carcass of Beef* is one of a series of studies; four such works are now hanging in museums.

the chance, Soutine would buy back some of his earlier paintings and destroy them. Sometimes he would turn so morose over the state of his art that he would not paint for months at a time.

This kind of dark mood shows in the self-portrait now in the Musée d'Art Moderne de la Ville de Paris. Few painters have ever looked at themselves with so much cruelty. Soutine was not a handsome man; his nose and lips loomed too large in plain and fleshy features. But he had none of the sheer ugliness set down in this painting. The self-portrait bears the title *Grotesque*. Soutine painted a forlorn figure with deep, anguished eyes, a twisted ear, a distorted shoulder, an apelike arm. A critic once described the self-portrait as a "pitiless, ruthless work, ridden with self-contempt."

Unlike a fellow Expressionist, painter Oskar Kokoschka, Soutine is not known as a portrayer of friends or celebrities. Most of his models were humble people whom he stumbled upon, often in servile or apprentice positions. They included choirboys, waiters, maids and peasants. He seemed to identify with them, looking on them as lonely and apart. "When he made these portraits," a friend said, "he tried to reflect into these people the sufferings that he had endured."

Soutine painted several portraits of young pastry cooks including the one that first attracted Albert Barnes. The best known is probably *The Little Pastry Cook* in the Orangerie in Paris. Painted in 1922, this is often regarded as a masterpiece of color, the red handkerchief clutched in the young man's hands contrasting with the shadowed white uniform. The angular features of the youth twist into a saddened, absent gaze. *The Room Service Waiter*, also in the Orangerie, has a far different look, a kind of haughty contempt on curled lips and high brow that is softened somewhat by the loneliness in the eyes. Uniforms seemed to fascinate Soutine, and this ill-fitting one gave him a chance to play the deepest red of the waiter's vest against the white of his apron and the blue of the background.

In his 1928 portrait *Madeleine Castaing*, now in the Metropolitan Museum of Art in New York, Soutine did paint someone he knew well. Marcellin and Madeleine Castaing had first come upon Soutine at the Café de la Rotunde on the Boulevard du Montparnasse shortly after Modigliani died in 1920. Marcellin Castaing, an art collector and critic, asked to see Soutine's workshop and handed him a large bill as down payment on a canvas they would pick out later. An angry Soutine, evidently insulted that the collector, out of some kind of charity, would pay for a Soutine before even looking at it, threw the bill back. It was not until 1925 when the Castaings bought Soutine's *Standing Choirboy* from Zborowski that they met the painter again. With some trepidation, they made an appointment to visit him in his atelier. "We arrived at 6 in the afternoon," Madame Castaing recalled recently, "and talked with him until 2 in the morning." That began a long friendship and association. When Zborowski died in 1932, the Castaings took over his role as chief collector, seller and protector of Soutine.

The likeness of Madame Castaing is not a flattering one (p. 139). It shows a wealthy, sophisticated woman, her lipsticked mouth twisted in hardness, her eyes brooding. Madame Castaing, now a 94-year-old widow, runs an antique shop on the corner of Rue Bonaparte and Rue Jacob on the Left Bank, and owns, according to the art critic and writer Alfred Werner, "what appears to be the world's finest and most comprehensive private collection of Soutines." Sitting in her living room below *Standing Choirboy*, the Castaings' first Soutine, Madame Castaing flashed an elfin smile during a recent interview. Her wide-open, glittering eyes accented a prettiness that is absent in the portrait that Soutine painted of her 60 years ago. Yet there was still

Veteran correspondent Stanley Meisler reports from the Washington bureau of the Los Angeles Times. *He wrote about artist Hieronymus Bosch, March 1988.*

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an uncanny resemblance. "Soutine told me when he painted me," she said, " 'Now you will never grow old.' "

For most of his life, Soutine could not remain settled, moving from one apartment to another, breaking away from Paris for long stays in the countryside and on the Mediterranean coast. Modigliani introduced him to the French Riviera town of Cagnes, where Renoir had lived during the last years of his life, and to the nearby resort of Vence; Zborowski sent him to the Catalan village of Céret in the Pyrenees foothills where Picasso and fellow Cubists Georges Braque and Juan Gris vacationed. The Castaings later invited Soutine to stay at their chateau near Chartres. He spent a good deal of time in these quiet and beautiful havens of France, and created some of his most turbulent landscapes there. But he would grow restless with the scenery he had chosen. "I want to get away from Cagnes," he wrote Zborowski in 1923, "a landscape that I cannot abide." Yet he returned.

The Houses, the extraordinary landscape of Céret (circa 1918) now in the Orangerie collection, shows how much vibrancy and energy and power could burst from Soutine. No one could spend any time with this painting (right) without feeling the excitement and sweep and pace. The cluster of little homes seems to push relentlessly leftward, the anthropomorphic buildings standing on their hind legs, their roofs reaching upward like the beaks of great birds. Duncan Phillips, founder of the Phillips Collection in Washington, D.C. (SMITHSONIAN, May 1979), once wrote that a Soutine landscape reflected "cataclysmic upheaval as if he had a premonition of our world's agony of total war." *Windy Day, Auxerre*, now in the Phillips Collection, churns with such upheaval. Soutine painted that landscape of the Burgundy region in 1939 while taking refuge from the terrifying anxiety of a France preparing to defend itself against Hitler.

Musée de l'Orangerie, Paris

Soutine painted *The Houses* during a stay in Céret, a small town in the Pyrenees foothills, around 1918.

Did he gore Rembrandt's ox?

In some of his most puzzling work, Soutine painted numerous still lifes of sides of beef, plucked chickens, hanging rabbits and dead turkeys. Some commentators believe that he was reaching back to his childhood and memories of the kosher slaughter of animals and poultry in his native Smilovichi. But it is also possible that Soutine was motivated at least as much by a need to explore both death and color. In the paintings of beef—the best known is probably *Carcass of Beef* in Buffalo's Albright-Knox Art Gallery—there is no doubt that he was inspired less by the kosher butchers in his boyhood village than by the Rembrandt painting *Slaughtered Ox* in the Louvre.

In 1925, Soutine rented a spacious workshop on the Rue du St.-Gothard and hung a huge carcass of beef there that he had bought across town at the slaughterhouses of La Villette. His model, Paulette Jourdain, would return to the slaughterhouses every few days to buy blood so that Soutine could freshen the redness of the meat. One day, inspectors from the department of health knocked on the door, intent on carting away the beef. Soutine looked at the men and turned deathly pale. "Be kind," Jourdain pleaded. "You see that he is painting the beef. He has to finish his canvas." The inspectors relented, injected the carcass with an ammonia deodorant, returned the next day to fumigate the workshop, and agreed to let Soutine go on so long as he promised to keep injecting the beef with ammonia.

The recollections of friends of Soutine brim with tales of his troubled relations with women. Mistrustful, shy and lacking confidence, despite the sales of his paintings, Soutine would take on and discard women friends with heedless haste. An affair with a Russian Jewish model produced a daughter, but he refused to support the child. Toward the end of his life, however, Soutine's relationships with women developed some

Collector Duncan Phillips once commented on the sensation of "cataclysmic upheaval" in his landscapes.

stability. He lived with two women in relatively long love affairs. One affair, almost idyllic, died in the hopelessness of war; the other, more mysterious and driven, endured until his death.

In 1937, he met Gerda Groth, a 27-year-old divorced German Jewish refugee, at the outdoor terrace of the Café du Dôme on the Boulevard du Montparnasse. A friend introduced him to her as "the great painter Soutine," but she had never heard the name before. While she lived with him, she never did find out much about his genius; he refused to let her look at his paintings. "It was Soutine the man who seduced me," she wrote years later. "As for his art, I hardly cared about it." Soutine did not like her name and, when she moved into his apartment at Villa Seurat, he came up with a new one, Mademoiselle Garde.

Soutine surprised friends like Madame Castaing by letting Garde take charge of his life. "Soutine lived in his apartment like an abandoned cat," Garde said. She cleaned the notoriously messy apartment; persuaded him to overcome his fear of the gas heater and take long, hot baths; accompanied him to various doctors for treatment of his worsening stomach ulcers; and supervised his prescribed diet. She found that her lover was a taciturn, inward, frugal man who kept the works of Balzac, Montaigne and various Russian authors in his small library, but no catalogs or monographs about himself. Breaking from his painting, he liked to take her to wrestling matches, neighborhood movies, the flea market and the Louvre. The American writer Henry Miller lived in another apartment in the same building. "Soutine is now quietly living below me, with his new red-haired model, a 'Soutine' in every respect," Miller wrote in a journal in 1939. "He seems tame now, as if trying to recover from the wild life of other days."

When World War II broke out in September 1939, Soutine and Mademoiselle Garde, on the advice of his doctor, were spending the summer in the countryside—the village of Civry in the Burgundy region. They tried to return to Paris, but the mayor of Civry refused to let them: the French government had restricted the movement of aliens. The mayor finally let Soutine go to Paris for medical treatment but refused to let Garde leave, even when Soutine came back armed with a permit. After seven months of futile appeals in Paris, Soutine again returned to Civry, determined to defy the mayor. He and Garde, carrying her suitcases, slipped out of the village in the dead of night. But their happiness lasted no more than a month. In May 1940, with German armies approaching the borders, the French government ordered the roundup of all Germans in France. Garde, taken to an internment camp in the Pyrenees, never saw Soutine again.

"As you know," Soutine wrote a friend after Garde was taken away, "catastrophe is everywhere. . . . Everything that happens leaves me unhappy. . . . In order to forget the nightmare, I paint, I draw and I read." An American painter then introduced Soutine to 34-year-old Marie-Berthe Aurenche, the former wife of the Surrealist painter Max Ernst. Marie-Berthe, beautiful and compulsive, took over Soutine's life. "For Soutine," his biographer Pierre Courthion wrote, "Marie-Berthe was a kind of dazzling fairy. She subjugated him, she pampered him."

Hiding Soutine from the Gestapo

The hunt for Jews in Paris had begun. One night in 1941, Marcel Laloe and his wife, the singer Olga Lucher, found their old friend Marie-Berthe at the door of their apartment in Paris. Could they hide a man hunted by the Gestapo? It was the celebrated Soutine. The Laloes agreed and kept Soutine and Marie-Berthe with them for three months. But the concierge of the building eventually became suspicious. Soutine and Marie-Berthe hurried out of Paris in

Madeleine Castaing was an early friend and collector of Soutine's work. With her is *Standing Choirboy.*

the summer of 1941, headed for the Loire Valley.

They settled on a farm outside the village of Champigny-sur-Vuede, near the town of Chinon, 170 miles southwest of Paris. "Oh, this flat country, these straight trees," Soutine said when he arrived. "I need twisted trees." Despite his aversion to the flat land, Soutine started to paint again, mostly landscapes of Champigny, but his forced stay in the countryside and the humiliation of the yellow star that he had to wear because he was Jewish did not calm his stomach ulcers.

In the summer of 1943, Soutine, weakened by anemia and terrible pain, was rushed to the hospital in Chinon. Courthion writes that Marie-Berthe refused to heed the recommendation of the doctor for an immediate operation there in Chinon. But Marie-Berthe, in an article published nine years later, insisted that the doctor had told them the operation could be performed only in Paris. It has never been clear why, but the ambulance took a circuitous route through Normandy before reaching Paris more than 24 hours later. When Soutine arrived at the clinic, surgeons operated immediately, but it was too late. He died of a perforated ulcer at 6 in the morning on August 9, 1943.

Marie-Berthe arranged for burial in the cemetery at Montparnasse. Among the few who came to the funeral were Pablo Picasso, the playwright Jean Cocteau, the poet Max Jacob and Mademoiselle Garde, recently released from internment and possessing false identity papers. Marie-Berthe later used funds from the sale of paintings left by Soutine to pay for a stone slab on which a large cross was cut. He had never converted to Christianity, but Marie-Berthe thought he might have if he had lived. "We had sometimes talked about the Christian religion," she said, "and I had the impression that Soutine wanted to know it better." Space in the grave was left for Marie-Berthe, and she was buried there after she committed suicide in 1960.

Some admirers, such as Madame Castaing, believe that Soutine has not yet received from critics the place that he deserves in 20th-century art. Yet his place is distinguished. His personality may have puzzled many people, but they accepted his genius. Jacques Lipchitz, unsure whether to like or pity him, could never understand Soutine as a man. But he had no doubt about his art. "He was one of the rare examples in our day," Lipchitz wrote, "of a painter who could make his pigments breathe light. It is something which cannot be learned or acquired. It is a gift of God." Uncle Morris would have been astounded by such praise and more than a little proud of his cousin Soutine.

Blazing color, force and fire inspire the artist's *Madeleine Castaing*, a 1928 portrait of his associate.

Metropolitan Museum of Art

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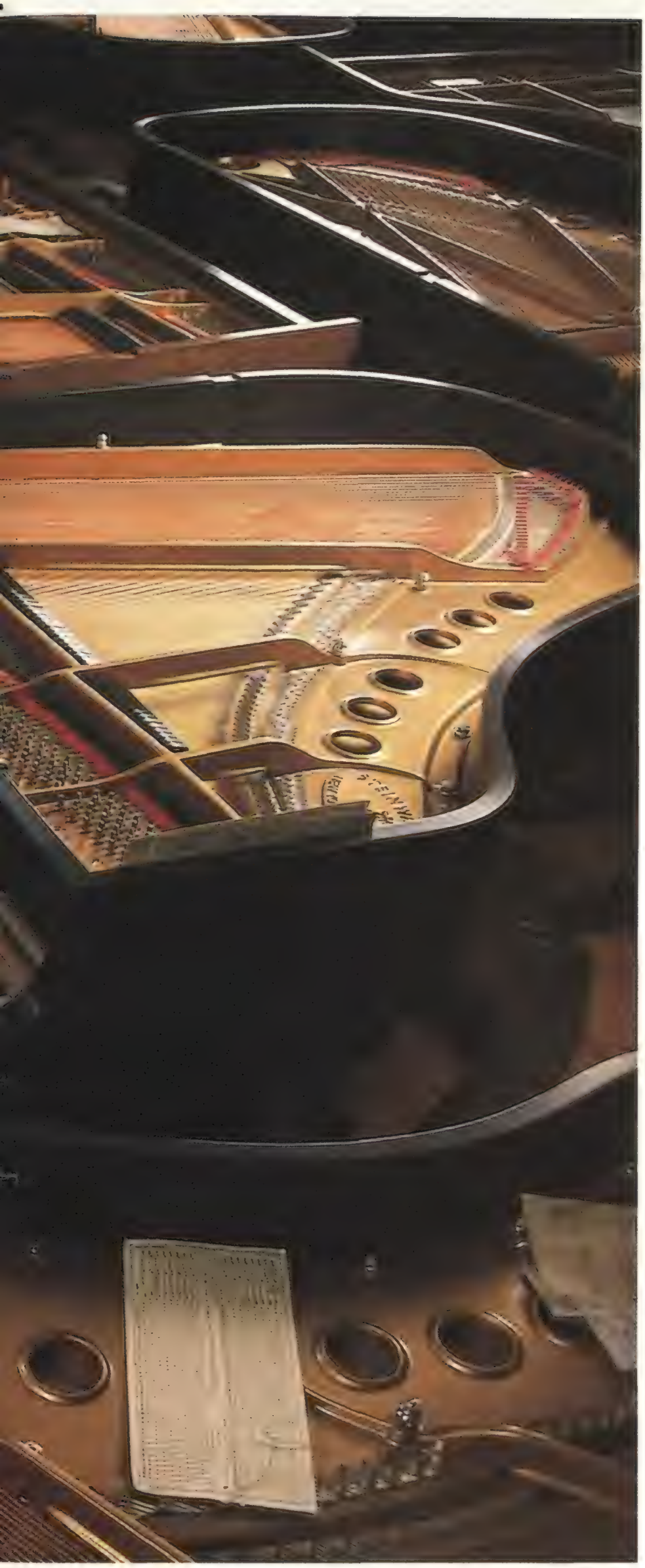

By Edward Rothstein

To make a piano of note it takes more than tools

At Steinway & Sons, it also takes about 12,000 individual parts, 135 years of experience and maybe some controversial new directions

By the time the unveiling took place at the gala concert in Carnegie Hall early last June, the restlessness of the audience was unmistakable. For four hours, one distinguished pianist after another had come onstage to play a brief selection as if engaged in some relay race of encores. Every musical bit was introduced with labored wit and piety by two masters of ceremony. The houselights dimmed and brightened over and over. Despite the photographs of Liszt, Arthur Rubinstein, Busoni and Rachmaninoff looming above the stage like deities, it was easy to forget what the fuss was all about: a celebration of Steinway & Sons, the piano maker that has supplied the greatest pianists of the past 135 years with some of their finest instruments.

Certainly no one could deny that the tribute was well deserved. Liszt called the Steinway a "glorious masterpiece," one that gave delight late in life to his "old piano-weary fingers." Wagner acclaimed its "wondrous beauty." Rossini said it was "as great as thunder and the storm, and sweet as the fluting of the nightingale on a spring night." The generations that followed echoed the hyperbole and now, after so many decades of glory, Steinway had manufactured its 500,000th piano, which it intended to introduce as the climax of this special evening.

Raymond Parada, a Steinway employee for 29 years, adjusts tones of a grand piano at firm's New York plant.

Photographs by Bob Krist/Black Star

What it takes to make a piano grand

Smithsonian Institution

Known as "the gold grand," Steinway's 100,000th piano was designed specially for White House in 1903.

Firm's founder, Heinrich Steinway, was a successful piano maker in Germany before he came here in 1850.

Pianos have a long tradition of extravagant decoration and showy plumage. At the turn of this century, fancy designs sported gold filigree and lids painted with pastoral pictures, just like 18th-century harpsichords. Steinway's 100,000th piano was one such instrument. Made for the White House in 1903 and now housed at the Smithsonian, it features a florid case modeled on French designs that paid homage to the wealth and cultivation of their owners (above). The 300,000th piano, produced for the White House in 1938 as a replacement for the 100,000th, is a "state" piano; its allusions refer not to Europe but to the New World. Its legs, like those of the 100,000th, are gilded bald eagles. Its mahogany case is decorated with such scenes from American music as the New England barn dance and the Virginia reel.

Unlike the others, the case of the 500,000th piano was not executed with "loving solicitude" (as the Steinways once put it) at the company's famed New York factory. Instead, Steinway went out of house for its self-tribute, asking Wendell Castle, an acclaimed furniture designer, to create something special. Castle came up with an approach he considered "monumental," but when the mysterious instrument (opposite) finally did appear on the Carnegie Hall stage it didn't seem monumental at all. Its squat legs were inverted pedestals. The case was striped with diagonal lines bearing hand-engraved signatures of every current pianist under contract to Steinway—more than 900 of them. The body was artificially "streamlined"—strikingly angular, with sloped side arms bracketing the keys. It almost looked electronic. And when, past midnight, a 10-year-old prodigy sat down and played it, the sound was brittle and unsubstantial.

One piano and one gala do not, of course, a company make, but to some members of the audience that evening the jarring notes in the program seemed consistent

Pianists gather around company's 500,000th piano after concert gala at Carnegie Hall last summer.

with Steinway's recent past. During the last two decades, the honored family firm has become a corporate-owned firm and then a privately held firm, all the while flirting with decline and even extinction. Although Steinway appeared to gain a new lease on life when it was purchased by several Boston-based entrepreneurs three years ago, there are those in the musical world who still harbor misgivings about its current management and direction.

A lot is at stake. Steinway pianos have been the overwhelming choice of concert pianists in part because they represent a form of mechanical and esthetic transcendence, promising more than most artists can call forth. There are other styles of piano sound—more "bell-like," more "rotund"—but the Steinway, with its bright upper notes and clear projection, has come to define the modern "public" piano sound. If the Steinway declines, so will the sound we hear from recordings and concert halls, the expectations we have of compositions, and even the very desire to hear the instrument that defines our musical heritage.

The first Steinway piano was actually a Steinweg. It was marked "H. E. Steinweg, Instrumentenmacher in Seesen," for it was in Seesen, in Germany's Harz Mountains, that the young Heinrich Englehard Steinweg made organs, guitars, zithers and pianos. He was the 12th child of a forester who adopted three more children after Heinrich was born. When Heinrich's father and older brothers went off to the Napoleonic Wars in the early 1800s, the family fled to the mountains where only Heinrich, a brother and a sister survived the cold and hunger. Soon after the wars, Heinrich, his father and three brothers were repairing a road when disaster struck again: a lightning storm killed all but Heinrich.

Seeing his family perish must have strengthened as well as saddened him; we can imagine resolve taking shape around the family he would one day have. The piano may have seemed an embodiment of his claim on the future; one of the first he made was a present for his bride. In these respects, Heinrich was not alone. The piano was the archetypal musical instrument of the bourgeois family.

It was invented in 1707 in Italy as a novel instrument able to play tones both soft (*piano*) and loud (*forte*), hence its name, pianoforte, and its distinction from the harpsichord. But it was in the home-centered northern countries that it took deepest root. It served as the locus for family and social life. It was studied and played by eligible maidens and ambitious bachelors. There were 60,000 pianos in Paris by the time Heinrich began making them, with 20,000 being made every year in England alone. Music was custom-sculpted for the instrument, capturing in its cries and arching melodies the desires of an aspiring class. The makers themselves shared those ambitions: nearly all were family dynasties, the piano binding together generations.

In search of untapped markets, Heinrich's son Charles scouted out the United States and urged the family to come. The men began by apprenticing themselves to piano makers and learning the manners of American business until, in 1853, the Steinwegs began making Steinways (*Weg* is German for "way").

Cartoonist parodied the Polish pianist Ignace Jan Paderewski, brought to America by Steinway in 1891.

Pianos were still evolving at the time and there were problems. The sound was often too weak for the larger halls. The "action"—the intricate mechanism that tosses a hammer against a string with precisely the right force—was often inconsistent. Many pianos were barely holding up under the demands of the music being written and performed. An account of a performance by Liszt told the story: "Daunted pianos lie around him; torn strings wave like flags of truce; frightened instruments flee into distant corners."

Within two decades of its arrival in New York, Steinway & Sons, as the new company was called, had changed the industry, improving the sound, the action and the structure of the instrument. The company combined the full, cast-iron frame that Boston's Chickering pianos had made famous, with a method of running bass strings *over* others, adding resonance. The Steinway factory, which opened on Varick Street in New York City, expanded the following year, then moved uptown in 1860 to Fourth Avenue and 52d Street to what was later called the "most extensive and perfectly arranged pianoforte manufactory in the world." By 1865, it was employing more than 400 workers and turning out 45 instruments a week. By the end of the century, Steinway had helped turn America into the dominant force in piano design and manufacture, a leader in an industry consisting of more than 260 companies that produced about 200,000 pianos annually.

Steinway's success was won through a combination of technical and marketing genius. In the crucial second generation, C.F. Theodore Steinway bore the technical mantle. By family accounts he was irascible, meticulous and Teutonic—remaining in Germany to run the Steinweg piano company there, only coming to New York after two younger brothers had died and his father needed help. A surviving photograph suggests that he was not to be trifled with, his eyes gazing imperiously above an imposing beard. By 1889, 41 out of 55 patents granted to Steinway were in Theodore's name. He worked with every element of piano design, ranging from the bridge to methods of rim construction still in use today.

Josip Karcic checks rims hanging in a room heated to 80 degrees. It takes one month to dry the wood.

Vying for the world's top pianists

His younger brother William was expert at the equally exotic mechanisms of commerce and public life. He approached those worlds with energy that must have matched his strength (he could lift a 130-pound keg over his head with one hand). He was as American and extroverted as Theodore was German and introverted. It was he who solidified a network of dealers that is still in existence today, and began to involve the Steinways in concert presentations. He arranged for the first American tour of the great Russian pianist Anton Rubinstein. William guaranteed "Ruby," as the musician was called, 200 concerts at $200 each if he would play only Steinways. In Buffalo, in New Orleans, in the mining camp of Central City, Colorado—in 215 often-rustic concert halls across the country—Ruby bore the name of Steinway along with his virtuosity.

William's example spurred the Chickerings and Knabes and Webers to sign up their own artists, and the competition for pianists began, with Steinway often victorious. Twenty years later, in another coup, Steinway brought the Polish pianist Ignace Jan Paderewski on tour. But at the 1893 Chicago World's Columbian Exposition, the local manufacturers insisted that one of their pianos be played rather than a Steinway. A cartoonist lampooned what became known as the "Great

Workers use press to bend rim around a steel form. Then braced rim is put in bending room for ten weeks.

Randheer Shewprashad pulls strings from hitch pins of frame (foreground) to tuning pins at keyboard end.

Chicago Piano War," showing Paderewski surrounded by different instruments, swirling effortlessly from one to another. In the end, though, he played a Steinway.

William's achievement was not simply in promotion. He recognized that the fate of the piano was inextricably linked to the fate of musical life in general. Like other master piano makers, he constructed a large concert hall, on East 14th Street in New York, to present artists playing the family instrument. He also made sure that ticket holders had to pass through Steinway showrooms on their way to the hall.

But the piano itself was not neglected. William and Theodore started a factory in Hamburg, Germany, which is in operation to this day. William bought 400 acres of farmland in Astoria, in the then-bucolic New York City borough of Queens, to construct a factory and foundry where Steinway is still located. He turned the surrounding area into "Steinway Village," building a free school, library and public bath for the workers, and providing reasonably priced housing and transportation. In addition, he became chairman of the New York Rapid Transit Commission, a member of the committee that unseated Boss Tweed (the corrupt leader of New York's Democratic Party) and a friend of Grover Cleveland's. When William died in 1896, a front-page obituary in the *New York Times* called him a "model citizen"; the mayor of the city ordered flags flown at half-mast.

Theodore Steinway's ideas became the model for innovation at Steinway & Sons—his relatives producing patents until close to the present time—while William's became the model for marketing. Today, Steinway's 100 dealers are still encouraged to become leaders of musical life, often lending their own modest halls for local concerts. William's key marketing idea also remains: a roster of pianists under contract who agree to play

Edward Rothstein, music critic for The New Republic *and a sometime piano player, is writing a book about music and mathematics.*

Michael Melford

Hammer, a felt-covered wooden mallet, pops up to strike string (not shown) when a player presses key.

A craftsman adjusts delicate hammer mechanism above keyboard. Interplay of piano parts is called "action."

the instrument exclusively, in exchange for having it made available to them anywhere in the world.

But the various issues Steinway faces in its maturity were latent in those early years of growth and achievement, most crucially the relationship between innovation and tradition. Would a change be an improvement in the instrument itself or merely a source of profit and convenience? This was not a simple matter of machinery versus craftsmen. A toast at the 1860 opening of the Fourth Avenue factory called it a "magnificent temple, devoted to industrial art, with its hundred altars of mechanism, whereon are worked out the cunning devices of manufacturing skill and artistic design, hitherto wrought out by the slow processes of handicraft."

Yet at the same time, Theodore possessed a great reverence for the quality of the final product. From the workmen he demanded, often brutally, nothing less than perfection. The motto that hung over his worktable was originally in German:

> Who knows his trade is a journeyman;
> A master is he that invents the plan;
> An apprentice, each and every man.

Theodore was by this definition at once journeyman, master and, most important, apprentice to the instrument. But the tension between modernization and humble craftsmanship grew over time, and remains a factor at the company today.

By the turn of the century, the modern piano had come substantially into being and Steinway continued to expand. In 1925 it constructed a new Steinway Hall on New York's West 57th Street—an imposing showroom with pillars of Italian marble and a domed ceiling. But not even a retail temple could help after the stock market crash in 1929. Out of the 142 piano factories operating in the United States in 1925, only 50 were left in 1932. Steinway sold 5,100 pianos in this country in 1925; in 1931 it had 2,100 sitting on hand. Steinway factories shut down for 25 months.

The firm survived because, unlike its American rivals, it did not cheapen its product, merge with other companies or sell rights to its name (it turned down million-dollar offers to license "Steinway" refrigerators and toasters). Thus, when the company's fortunes began to rise again, it could reconstitute itself. The integrity of the instrument was preserved during World War II as well, when the factory was largely turned over to making parts for Army gliders—and caskets.

Another reason for Steinway's survival was its extraordinary connection with the world's greatest pianists. The relations, however, were not always smooth. Arthur Rubinstein once took offense at a Steinway advertisement that proclaimed the instrument's use by Paderewski, Rachmaninoff and "others"—with the

Harry Selker, M.D.
Boston, Massachusetts

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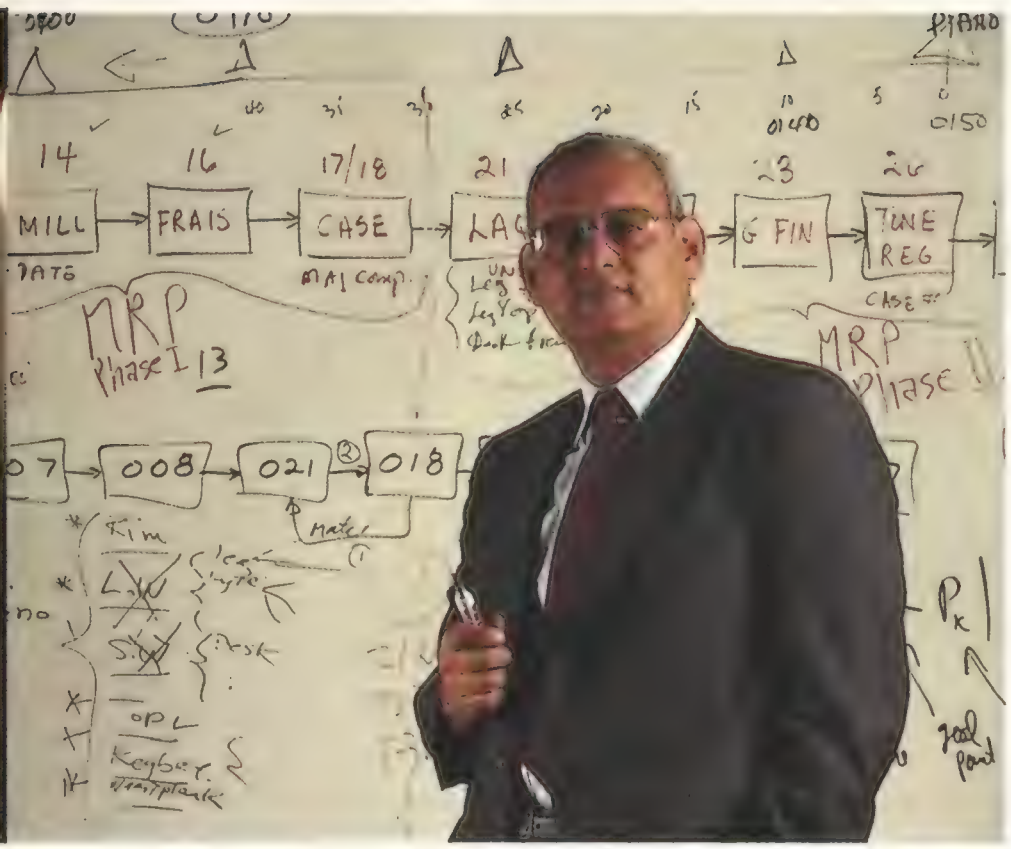

Daniel Koenig, director of manufacturing, uses an engineer's flow chart to explain how to build pianos.

Draftsman Kevin Rogers studies action on computer while engineer Severino Spitale uses traditional tools.

"others" listed in small type in alphabetical order. "I want you to know," he wrote Steinway, providing his own alphabetical roster, "whenever I talk about Baldwin, Bechstein, Bosendorfer, Erard, Knabe, Mason & Hamlin, and Pleyel, I never omit to mention the Steinway piano." The point was not missed.

Pleasing its artists was not the company's only problem. By the time Henry Z. Steinway, of the fourth generation, took over in 1955, there were conflicts within the expanding family, a smaller skilled-labor market, an aging plant, an uncertain future. Steinway Hall was sold along with land in Astoria to provide much-needed cash for capital improvements. By the early 1970s the company was thriving but production lagged far behind demand, and the next generation seemed relatively uninterested. So in 1972, with some controversy, Steinway & Sons was sold to CBS Inc.

"Family businesses are always impermanent," Henry Steinway says today, looking back. He doesn't regret the sale, but surely he could not have anticipated the chaos that ensued under CBS. There were four Steinway presidents in 13 years, while above them swirled constant corporate confusion. CBS plowed substantial investments into the New York factory but then it decided to sell its musical properties and put the firm on the block. There were rumors that Steinway's real estate in Queens was being considered for development and that the piano business would be dissolved, or that a new owner wouldn't find it worthwhile crafting a mere 5,000 Steinways a year and might just cash in on the trade name. Morale dropped, inventory rose.

The piano market plays a sad tune

In this respect, Steinway was not alone. The piano business in this country has reached new lows. Domestic manufacturers shipped only 91,367 instruments in 1987, the fewest since before World War II. America's most distinguished makers have lurched into bankruptcy or mass-market cheapening. Kimball and Baldwin now depend on furniture or electronics businesses as accompaniments to their piano sales. Meanwhile, Far Eastern companies such as Yamaha, Kawai, Samick and Young Chang are becoming a major presence in the United States, and electronic instruments have become the reigning royalty of the keyboard market. Though Steinway remains conspicuous at the prestige end of the scale—with prices for grands beginning at $18,450—its demise has at times seemed eminently plausible.

In September 1985, the company was bought by several Boston investors who pledged themselves to uphold the Steinway tradition. Robert Birmingham's background is in advertising and petroleum marketing. His brother, John, is a trial lawyer. Both possess a considerable fortune from their father's fuel company,

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Master carver John Angelis displays examples of his work: a pair of pedal lyres and (on floor) piano legs.

which was sold to Texaco during the 1960s. Bruce Stevens, who spent more than 17 years working for Polaroid, has become the new Steinway president. "I was looking for a business, and we heard Steinway was for sale," Robert Birmingham explains. "The attraction was a tremendous trade name with a product equal to it, which is a very rare thing. I can't say we bought it for musical reasons, but once we got in we began to smell the flowers."

Despite the metaphor, the current owners have made a number of personnel changes that emphasize businessmen and engineers, not piano men. The most controversial change was the removal of Joseph J. Pramberger as head of manufacturing. Pramberger was a 29-year Steinway veteran whose family had been with the company since 1916. In his place came Daniel T. Koenig, who had spent 21 years as an engineer at General Electric, where he worked with steam turbines and motors, and then as an industrial consultant for GE products. "I caused quite an uproar by coming," he says calmly, while indicating the reason: "From my point of view, the piano is essentially an engineered and manufactured product. The design of the piano has been too damn stable. It hasn't changed since 1920 or so, and neither have the manufacturing operations."

Processes have not, in fact, changed dramatically. Wood must be aged and dried, the bent rim tempered, the instrument's "belly" carefully assembled. More than 12,000 pieces are used, ranging from strips of deerhide and felt in the action, to strips of maple in the rim. But the musicality of the instrument—its tone, its silent action, the responsiveness of the hammers, the resonances—all these elements require extraordinary attention to nuance and detail. There are manufacturers, such as Yamaha, that turn out more pianos in a day than Steinway does in four months, largely because they have changed the tempering of the instrument and have automated the assembly.

Handcrafting, however, is not in itself a virtue, nor is mechanization inherently evil. Much of the machinery at Steinway accomplishes jobs that do not require attentive care from the human hand; the praised Hamburg factory is said to be more automated than the one in New York. The issue is how ears and minds control the hands and machines.

John Bogyos, who joined the company in 1929, possesses a nearly biblical knowledge about the Steinway piano. He retired from the department of research and development in 1986. For him, the Steinway is a religion as much as a piano, a repository of knowledge that requires years—a lifetime—to comprehend. "The Steinway was what it was," he says, "because of the thousands of little things that were done in it as well as they were. It is such a perfect piano. The whole thing was a system, worked out, tried out and then set forever and ever. Some of these people don't believe what I'm telling you, they just don't know."

"Will old-timers share their knowledge?"

As head of manufacturing, Daniel Koenig has a mandate to explore possible changes—to conduct research on the Steinway's hammers and action, and to oversee a transition to modernized production in the factory. "The methodology of building a piano is very well documented," he says, defending his lack of piano experience. "It can be learned in a textbook manner. Continuity is insured by doing the best we can to debrief the older people in the factory." But one former piano executive has his doubts about the practicality of the "debriefing." "Will old-timers share all their knowledge with the new people?" he asks. "Will the new people be able to interpret it and use it?"

The pledge to continue making the best Steinways ever is never far from management's lips. Some outside

technicians who have worked on Steinways for years believe significant improvements have been made in the mechanisms of the piano since the days of CBS. But critics are dismayed by plans to increase production and by certain other developments. For example, Steinway's cast-iron frames have always been polished, coated and drilled at the factory. The dimensions of the frame and the position of the holes help give the piano its "scale"—its string lengths and tonal quality. The drilling is now going to be done under contract outside the plant by the same foundry that is currently supplying the frames—a change that's being praised by some but mourned by others as a threat to the instrument.

Responding to what he regards as a weakening of the reputations of Steinway and other top manufacturers, one former piano restorer, Santi Falcone, has actually gone against the industry trend by starting his own factory in Haverhill, Massachusetts. Falcone vows to make pianos with more care than any other maker in business today. Only 150 or so of his instruments have been produced so far. They're priced slightly higher than Steinway grands, but they have already acquired a following.

The results of the transformations taking place at Steinway will not begin to show up for several years. Dealers claim quality is better now than it has ever been, but they've never said different. Others worry that if traditional craftsmanship is not honored, the company is headed for decline, in which case Steinway would soon come to mean no more than Chickering, Mason & Hamlin or other once-revered names. Retiree John Bogyos, for one, wonders what might happen, based on what he has seen and heard. "I love the Steinway," he says. "And I am sad, yes. But not too sad. All things change. You know, my wife died a few years ago and I am still missing her. But after she died I went to the mountains of Virginia, where she was from, to recuperate. And I got a tremendous pleasure out of being where we used to be. I am convinced that nothing ever completely dies. Nothing ever disappears. Neither will the Steinway. It is too good to let it go."

Frank Urich, an expert at refurbishing Steinways, works on a 1903 model. When he's finished with it, the piano won't need another rebuilding job for 80 to 100 years. The true test of a great grand piano is time.

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When you were a little kid, nothing was more thrilling than Halloween. You'd run around like a banshee trying on your Dracula fangs, ghoul mask, or Frankenstein elevator shoes. Then, off you'd go frightfully happy clutching your trick-or-treat bag.

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By Jack Fincher

Grease monkeying may never be the same again

On NPR's airwaves Tom and Ray Magliozzi turn the sore subject of car repairs into a practical, and often rib-tickling, affair

Learning to drive was a nightmare for me. My instructor was a moonlighting matron who taught with an automatic transmission, assuring me all the while that I would have "no trouble" switching to stick. How the shiftless hussy lied.

Perhaps in consequence, on my list of life's compatibles, driving and laughter have never kept company. Ditto for auto repair. Or so I thought until, one Sunday morning, I turned on National Public Radio (NPR) and heard the following:

MALE CALLER: I have a question about Saab maintenance. Is it complicated enough that it really has to be done by a dealer or can a neighborhood mechanic take care of it?

FIRST MAN ON MIKE: The answer is, it depends. If it's changing the oil, for example, sure. Almost any single-digit-IQ mechanic can do that, but it depends on what you mean by maintenance. Do you have your little book with you?

MALE CALLER: Yep.

SECOND MAN ON MIKE: I was afraid of that. I had hoped to tell you to go out to your car and get it, then call back at 8, after we've left.

FIRST MAN ON MIKE: If, for example, it says something like "adjust the valves," your neighborhood garage probably wouldn't be able to do that, because they don't have the shims.

SECOND MAN ON MIKE: Here's what you do: take your book, photocopy the entire text, send it to my brother and he will put next to each item a *D* for dealer and a *C* for corner gas station.

MALE CALLER: OK.

SECOND MAN ON MIKE: I promise he'll do it. Tune in next week, and I'll read them off over the air.

FIRST MAN ON MIKE: No, there are some things that can be done by any mechanic. Assuming, of course, your neighborhood gas station works on Saabs to begin with. Have you established that?

MALE CALLER: Will he give me a straight answer if I talk to him?

SECOND MAN ON MIKE: No. You have to hide across the street in a van with darkened windows for about a month and see how many Saabs go in and out.

Somewhere along there, I caught myself smiling. About car upkeep—a lifetime first. In the words of Butch and Sundance, who *were* these guys anyway? The following Sunday I again tuned in *Weekend Edition*. "OK," a voice said, "you've stumbled upon NPR's *Car Talk* with Tom and Ray Magliozzi of Cambridge, Massachusetts. Otherwise known as Click and Clack, the Tappet Brothers. . . ."

This time their rapid-fire advice—a barrage of blue-collar banter like a couple of garrulous Beantown cabbies trapped side by side in rush-hour traffic—went something like this:

MALE CALLER: I have a 1962 Ford Fairlane.

TOM: Great car!

MALE CALLER: Yeah, it is. But lately, whenever it rains, the car starts up fine, then after a few seconds it gets a little rough. The more it warms, the worse it gets. If you finally get the right balance by giving it a lot of gas, it will go a block or two, then completely stall out.

TOM: I think it's the carburetor.

RAY: Yeah. If a carburetor is running too rich, it'll run OK in dry weather, but in wet weather when the spark is weak, the extra gas puts the flame out. Yours may be flooding so badly it won't run more than a block or two. You may need to rebuild the carburetor.

MALE CALLER: But on a sunny day, it runs beautifully.

TOM: Every jalopy runs beautifully on a sunny day. On a sunny day all's right with the world. Why, even ants on your picnic blanket don't bother you.

RAY: Before you do anything, make sure it's tuned up well. You might even want to have an exhaust-gas analysis done. You have one '62 Fairlane, I understand?

MALE CALLER: Yeah, that's right.

TOM: You need at least two. You should have a tow bar and always drive with one behind the other.

MALE CALLER (getting into it): I could have one carburetor set to run only on rainy days.

Under an ailing Subaru at Good News Garage, Tom (left) and Ray ham things up as Cain and Abel.

Photographs by Richard Howard

During their regular *Car Talk* radio show on Boston's WBUR, the MIT-trained brothers dispense rapid-fire advice to callers woeful about carburetors, clutches and car care. Magliozzis deplore jackrabbit starts, unchanged oil and the widespread belief that automobiles are "only going to last 60,000 miles."

TOM: Like train engines. You could have an engine in the front and an engine in the back, and drive which ever one runs that day.

RAY: What you do is you hook the two rear bumpers together. If you're going to the North Shore, you drive Car A, and if you're going to the South Shore, you drive Car B.

TOM: Back to back! I would never have thought of that.

I was hooked. So, I found out, were legions of other people, of both sexes.

Today literally millions of Tom and Ray fans either listen to the syndicated *Car Talk* hour on NPR stations or tune in to a rollicking five minutes on *Weekend Edition* every Sunday morning. What they get is a mix of impromptu automotive advice and comic asides about something historically dear to the American heart. Along the way the Magliozzi brothers manage to say irreverent things that badly need saying about the American motorist, car manufacturers, modern automobile technology and our much-maligned auto repairmen.

Some things are pretty basic; some are more intricate and laced with irony:

"Only four guys understand today's carburetor. They're in Japan and we won't give them visas."

"Car exteriors all look alike because only a few aerodynamic shapes work. Automakers are concerned about mileage now. They all want to make a car that's slippery."

"People believe cars are made to self-destruct. They think, 'This car is only going to last 60,000 miles,' so they don't bring it in for service and it lasts 60,000 miles. If you get less than 100,000 miles out of a car, you're being cheated."

To learn more about this pair I crossed the continent to Boston and found the Magliozzis in the throes of a marathon fundraiser for their flagship station, Boston University's WBUR. Ray, 39, the one with the mustache, turned out to be a former Vista volunteer in San Antonio, Texas, an amiable younger brother with the voluble energy of Danny DeVito. At 49, Tom, the one with the beard, is deeper-voiced and rabbinical looking. It was a Sunday-night special—they weren't even getting their usual $50 stipend—and the brothers were off and running.

FEMALE CALLER: My 1981 Mustang keeps dying on the Massachusetts Turnpike. I got a new carburetor put in, but that didn't help. I went to another mechanic and he put in an EGR valve. That didn't help, either. I'm not sure whether or not I let up my foot on the gas pedal unconsciously, but it just dies.

TOM: Are you frequently unconscious when you drive?

RAY: OK, a lot of things come to mind. The most likely is an electrical problem. It doesn't sound like a carburetor or fuel glitch at all. And a bad EGR valve is the least likely. If you described these symptoms to your mechanic and he replaced the carburetor, you were right to change mechanics.

Jack Fincher admits he does not know a valve and ring job from a loose kingpin. He got his first laugh about car repair while listening to Car Talk.

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TOM: If the other one put in the EGR valve, change mechanics again.

RAY: And tell your next mechanic to look at the electronic ignition module, because that's what it's going to be. That or the ignition coil.

Tom and Ray both hold degrees from the Massachusetts Institute of Technology, Tom in chemical engineering, Ray in humanities and science. But book learning, they hasten to add, had nothing to do with their currently booming career as broadcast mechanics. Indeed, each of them got where he is today—"wherever *that* is," Tom interjects—by taking a sharp turn away from the more accepted avenues that lead out of higher education.

For Ray, this meant abandoning a job teaching junior high science in Bennington, Vermont, and overcoming an aversion to engineering theory as taught at MIT. "It was too equation-oriented," he recalls. "Instead of grunting out the answer I'd say, 'For three bucks we can build this thing and see if it works. What are we diddling around for?' My professors didn't like that approach at all. But I was always intrigued with how things work, how they break, how they can be made not to."

For Tom, the turning point came when he tired of working for a Boston firm that manufactured automatic control systems and decided to "be a bum for a while." He went to two banks and borrowed "as much money as they would lend me, figuring I could live on half and use the other half over time to pay them back." He spent his days reading newspapers and library books, drinking coffee and dining at an all-you-can-eat joint. "It's amazing how little you can live on," he says, "when you have nothing else to do. And how much time you can spend doing it."

At the same time, he realized, "the cost of getting things fixed was going higher and higher, and the Me generation was becoming more and more interested in getting personally involved with the nuts and bolts of their lives." In the early 1970s Ray coaxed Tom out of premature retirement and, together at last, the brothers took a flyer on an idea they'd had for a do-it-yourself garage, in which clients with sick cars would rent space and tools but do their own repairs. Their mother—"She's always thought we'd eventually win a Nobel Prize"—was aghast.

"You say, 'Aw jeez,' and end up helping everybody"

The do-it-yourself idea died quietly in traffic. "We thought we were gonna stand around in clean, blue lab coats and give people advice," Ray remembers. "Instead, we ended up with clients who didn't know a dipstick from a dashboard. You can't help but feel sorry when some poor guy who's paying three bucks an hour to rent a stall takes his carburetor apart and then can't put it back together. You say, 'Aw jeez,' and help him out. The next thing you know you're helping *everybody*."

Tom, who now holds two MBAs and teaches marketing at Boston University, agrees. "That's why we went broke. We fixed everything ourselves, for nothing. What we should have done was screw up everybody."

Having learned their lesson, the Magliozzis elected to practice what they would later preach. They opened, and still operate (Tom as silent partner), a cavernous repair shop in Cambridge called the Good News Garage, a neat, orderly, well-lighted place so clean you could eat deli off the floor—if the brothers didn't prefer Chinese down the street.

With client on the phone, Ray, who runs the garage, looks for open slot on jammed repair calendar.

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ABOVE AND BEYOND℠

Pete Kairo, a dedicated mechanic and spare-time bluegrass artist, works on a wayward starter motor.

A one-month wait for an appointment is the norm and the day I visited, all bays at the Good News were full. Talk among the hangers-on concerned a Soviet newspaper story somebody had tacked up on the bulletin board about one E. Osipov who, it would seem, ordered a brand-new automobile for 17,000 rubles ($27,000). When it was delivered not only did the ignition fail to work, but the generator was broken and the exhaust pipe had fallen off. It took E. Osipov seven months to get repairs. The rear axle had to be fixed four times, the ignition three times and the carburetor twice. When E. Osipov got the car back, 2,187 more miles had been logged on the odometer. The white rear fenders were now gray. Some drunken mechanic had put four big dents in the roof trying to smooth out a small one.

Intoned the official state newspaper, *Izvestia*: "Fantastic but typical." Editorialized the *Boston Globe*: "A job for Click and Clack, the Tappet Brothers?" Now there's a thought. United Nations—or the World Court —please copy.

Tom Magliozzi was teaching class that morning. Ray, typically, was on the phone. "Robert? Those shocks you sent for the Cavalier?" he is saying to one of their suppliers. "They're the wrong ones. That's right, buddy."

Two young guys arrived in a battered van that was cursed with a grinding sound. Ray took it out for a test ride. "Have you let the oil go?" is the first thing he asks when he gets back to the shop. After a flicker of hesitation, one of them says no. Ray laughs. "You wouldn't tell me if you had. See the speedometer needle jump? That tapping could be the speedometer cable. You've got a noise, that's for sure. Let's put it up and spin the wheels."

Ray, meanwhile, has paused to inspect a Buick Skylark that has a brake problem. "The cable's rusted," he announces after a quick look beneath the chassis. "Usually the water that gets in one end of it comes out the other. But on this one, uh-uh. The water got trapped in there. That's your first American passenger sedan with a front-wheel drive, and they made a lot of mistakes with it."

A college student called wanting the Magliozzis' assessment of his roommate's Toyota. The roomie is asking $2,500. Ray asks him several quick questions, then concludes, "Anything else, I'd go $900. But a Toyota, $1,500." He hung up and looked at me. "The first rule in buying a secondhand car is this: if you look under the hood and don't see the ground, stay away from it."

When pressed, the Magliozzi brothers tend to credit their expertise to endlesss hours under the hood of a succession of heaps in high school, as well as the two-way osmosis between themselves and a series of exotic employees who sound suspiciously like characters out of an urbanized Garrison Keillor show. Pete and Howie, for instance, who, when they aren't repairing brakes, play bluegrass professionally. (Tom and Ray are talented amateurs on bass fiddle and acoustic guitar.) Howie is also a creative-arts therapist. Pete was formerly music director of an Off Broadway show and housemaster to some emotionally disturbed kids. He studies Japanese.

Or Nigel, the English expatriate who learned to make his own auto parts in Mexico. Says Tom, "He fixed everything by taking it apart until he found the one little piece that was broken." Remembers Ray, "You'd say, 'Nigel, for $19 you can *buy* a rebuilt starter motor, instead of spending five hours fixing it.' And he'd say, 'Aw, it's just this little pin, mate . . .'"

Anarchy on the airwaves of public radio

Thus radically armed and establishment dangerous, the Magliozzis were ready on a memorable day a decade ago when WBUR invited a bunch of Boston-area car mechanics to come in and kick around the subject of auto repair on the air. Or at least Tom was ready. Ray had to mind the shop. As it turned out, nobody else came and Tom held forth alone. The public response was instantaneous and overwhelming. A week later Tom brought Ray. The following week the brothers arrived to find a note in their mailbox from the host announcer: "Sorry I missed you guys. Good luck!" Perhaps anticipating the anarchy of the airwaves to come, the announcer had decamped for California. Public radio in New England has not been the same since.

In 1986 an NPR producer driving back to Washing-

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"We'll have to keep your car another day. There's a devilled egg in the carburetor."

Drawing by Booth; ©1973 The New Yorker Magazine, Inc.

Classic cartoon by George Booth reflects prevalent public sentiment about general efficiency of garage mechanics. Tom and Ray also zero in on feckless American motorists and their passion for destructive speeding.

ton, D.C. from Maine heard them, and the Magliozzis were on their way to becoming the funniest thing to happen to automobiles since the Edsel. For suffering car owners they may be the best thing to come along since Japanese imports and the lifetime warranty.

Today Tom tools around Boston in a rusty, blue '74 Chevy convertible, while Ray prefers an '87 silver and charcoal Dodge pickup truck. "I like new," he says. They have been known to grandly autograph used auto parts thrust at them by adoring "moto-groupies." The only trouble, Ray notes, is that "there are twice as many models manufactured now as there were ten years ago. People know less; *we* know less. Even if you read like crazy, there aren't enough hours in the day to keep up on the technical end.

"Like everybody else, when we get home at night the last thing we want to think about is cars," Ray continues. "We want to romp with our kids, relax, read a book, watch TV, play music." Adds Tom, "In five years *all* mechanics, not just the Good News Garage, will be forced to specialize." In ten years, "Who knows?" laughs Tom. "We won't be doing anything like what we're doing now. Cohosting the Carson show? Or maybe brain surgery."

"Yeah, brain surgery!" whoops Ray at the thought. "Together."

Meanwhile, American automobile owners keep on doing dumb things, and paying auto shops an estimated $70 billion each year for car repairs. Because the car-driving public clearly needs all the help it can get, Tom and Ray are busily creating an airwave anthology of automobile problems and what to do about them:

• The Old Car Problem

Female Caller: I've got a '78 Celica with 117,000 miles. It seems to be just falling apart. It needs a new alternator, it's had to be towed a couple of times, it's becoming difficult to shift, especially when cold. And it clanks in reverse.

Ray: How's the rust?

Female Caller: The rust's OK. It's not from here.

Tom: You imported the rust?

Female Caller: No, we're new in Boston. The engine's starting to run hot. Listening to you, I know I need a new head gasket.

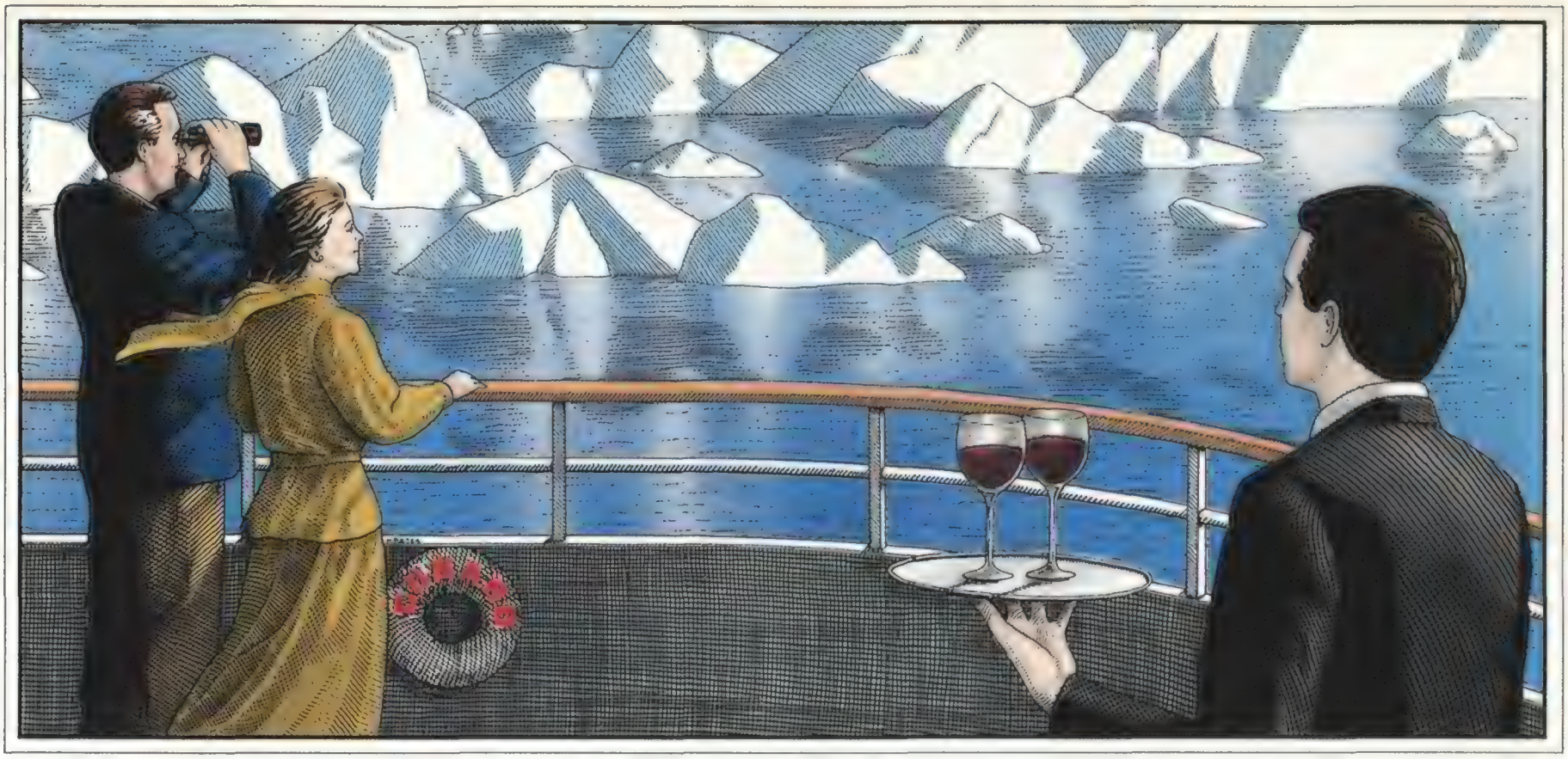
Tom: Don't be an alarmist. You might have a bad hose.

Ray: Here's what you need. A clutch. A radiator. Universal joints. Muffler bearings. Bring it to your mechanic and say, "Check it out stem to stern, money's no object. Do whatever you have to do to determine what's wrong with it and what has to be done to make it last two more years." Then sit down and decide if you want to spend that much money or put it down on a new car.

Female Caller: What will I have to do to sell it?

Tom: Wear a mask, for one thing.

Ray: She's under no legal obligation except to make



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sure it passes the Massachusetts state inspection. Have your mechanic check out all the inspection-related items, then go ahead.

TOM: If you can find some screwball to buy a car with 117,000 miles, it's worth 500 bucks.

• THE OIL PROBLEM

FEMALE CALLER: I have an '82 VW Quantum . . .

TOM: And you can't find any Quantum mechanics?

RAY: Go ahead.

FEMALE CALLER: This winter it started using oil. A lot of it.

RAY: How much is a lot?

FEMALE CALLER: About . . . two quarts every thousand miles? But it doesn't have blue smoke. I never see it. And before that it never burned oil at all.

TOM: You wouldn't see blue smoke. Not at this rate. You'd have to be burning a quart every 50 miles. Even then you'll only see blue smoke if you look for it.

RAY: How many miles on this jalopy?

FEMALE CALLER: About . . . a hundred thousand.

TOM: It's burning oil.

RAY: You know why? Because you didn't change it often enough when this engine was a youngster.

FEMALE CALLER: Is it too late to do anything about that?

RAY: Yeah, too late. How often do you change the oil?

FEMALE CALLER: Like . . . twice a year?

TOM: Twice a year and you drove 100,000 miles? In five years, 20,000 miles a year. Every 10,000 you change your oil?

FEMALE CALLER: I think so.

TOM: Sheesh, that's shameful.

RAY: It's a wonder you've gotten a hundred thousand miles out of this thing.

TOM: It's a testimony to good German engineering. If you had been conscientious about this, you probably could have gotten 200,000 miles out of this motor. Now it's garbage.

FEMALE CALLER: Oh, no! I have to make it last.

RAY: Buy five cases of oil and carry them around in the back. Change the oil every 3,000 miles. Putting this nice clean oil in there will probably stop your consumption, or at least lower it.

TOM: Change the oil right now. Tomorrow morning before you do anything. *Tonight!*

• THE BRAKE PROBLEM

MALE CALLER: I've got a '71 Satellite station wagon I get into once or twice a month. It's parked in a remote place. There's no problem starting the car, but the brakes go clunk-clunk-clunk.

RAY: As you're driving?

MALE CALLER: As I apply them.

RAY: These brakes suffer from a bad case of inactivity.

TOM: Yeah, they need exercise.

MALE CALLER: I changed the front calipers on both wheels.

RAY: And did it make noise immediately after you put them on?

MALE CALLER: It's not just the noise. The brake grabs and lets go, grabs and lets go.

TOM: Does the pedal pulse up and down?

MALE CALLER: Not too bad. The light goes on while it's pulsing.

TOM: What light?

MALE CALLER: The brake light.

TOM: Jeez! Oh-ho! Don't tell me where it is, but if your car happens to be in the vicinity of a bulldozer, have them bulldoze a long ramp into the ground and drive it in there. Don't use the brakes—let it coast in.

Do Tom and Ray have a single, final, hard-won word of wisdom for American drivers? "Sure. First and foremost, go easy on your car," Ray replies. "How you drive is the most important factor in determining how long it lasts. How hard you accelerate from a dead stop is more important than changing your oil, getting a tune-up, rotating your tires, anything. That's why one car with 50,000 miles on it runs great, and another is ready for the junkyard."

Tom nods. "When I become Philosopher King of the United States, I'm going to make the speed limit 35 miles an hour—seven times faster than you can walk. Nothing should be allowed by law to go any faster. No vehicles, including space shuttles. Not bullets, even."

Tom tools around in old cars like this '74 Chevy convertible. Brother Ray prefers an '87 Dodge pickup.

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By James A. Cox

The day Joe Louis fired shots heard 'round the world

In 1938, as war clouds gathered abroad and Nazi racism flared, his rematch with Schmeling became a national obsession

Louis, who had been beaten by Max Schmeling two years earlier, this time smothered his German opponent with lefts and rights, 40 punches to Schmeling's two, in a 124-second, savagely punishing fight.

June 22, 1938, a Wednesday morning. Newsreel cameras and a crowd are waiting in front of the New York Boxing Commission office. At a few minutes before 11, state troopers on motorcycles usher a long black sedan to the curb, then dismount and join representatives of New York City's finest in holding back the crowd. A cheer goes up as five men get out of the car—Joe Louis, heavyweight champion of the world; his trainer, Jack Blackburn; his managers, Julian Black and John Roxborough; bodyguard Carl Nelson, a Chicago detective. Louis is wearing a light suit, a polka-dot scarf instead of a tie, a white fedora with a black band and sunglasses. He cuts quite a dashing figure.

Inside the boxing commissioner's offices, stripped down to trunks for the traditional weighing-in ceremony, his figure is even more impressive. He is 24 years old, and under satiny skin his muscular body is lean and hard, the reward of four months of rigorous workouts at his training camp in Pompton Lakes, New Jersey. He nods at Max Schmeling, the man he will fight that evening. Schmeling, beetle-browed, with a shock of black hair, is also in trunks. As the only German to win the heavyweight championship of the world, he is trying to win back the title. He is old for a fighter, almost 33, but he knocked Louis out two years ago, before Joe won the championship from James J. Braddock. There are people who would like to see him beat the black American again.

There was no trading of insults

Silently, they step on the scales. Schmeling weighs in at 193, Louis at 198½. They square off in simulated fighting pose, another tradition, for the benefit of the photographers. There is no braggadocio, no trading of insults for some imagined psychological edge. Questions and flashbulbs pop. Hurriedly, the two fighters dress and leave. They have said nothing to each other.

Louis and entourage spend the afternoon at a friend's apartment nearby. Bill Bottoms, the man who cooks for Joe, prepares a big steak-and-salad dinner, which the champ eats at 3. Later, he goes for a walk along the Harlem River with Blackburn and Freddy Wilson, friend and sparring partner. Wilson asks him how he feels and Joe says, with a little laugh, "I'm scared."

"Scared?" says Wilson, disbelieving.

"Yeah," says Joe. "I'm scared I might kill that Smellin' tonight." That evening, they arrive at Yankee Stadium at 7, and in the dressing room, less than three hours before the biggest fight of his—and perhaps any fighter's—career, Joe Louis takes a nap.

Outside, as more than 70,000 fans file through the gates, Jewish groups picket for a boycott of the fight, the Non-Sectarian Anti-Nazi League hands out leaflets calling for a boycott of German goods, and Communist

At weighing in, both men were polite and impassive. Louis fought at 198½ pounds, Schmeling at 193.

A disputed blow to the back disabled Schmeling, cracking two vertebrae.

groups hoist placards urging three cheers for Louis and boos for Schmeling. Gradually the bleachers and grandstand fill. The best seats, row on row of folding chairs in the infield on all sides of the ring, go for $40, except those reserved for hundreds of sportswriters and broadcasters from all over the world. "Uncle Mike" Jacobs, the fight promoter who got his start as a ticket scalper, has cleverly mingled with the working-press celebrities and the other high rollers who willingly part with $200—some claim a record $500—for a ringside seat.

At 9 P.M., Blackburn wakens Joe and begins to tape his hands.

Flexing his fingers against the bandages, Louis says, using the nickname he and Blackburn have for each other, "In three rounds, Chappie. If I don't knock him out in three, you better come in and get me, because after that I'm through."

"No," says Blackburn. "It's all right. You can go 15."

Later, Joe would explain that he was going to throw so many punches he wouldn't have any left after the third round.

In another dressing room, Max Schmeling has a bad case of nerves, a condition uncommon for him. What bothers Schmeling is the attitude of the American public, so different now from what it was for the first fight two years ago. Then he was treated like a hero, in fact as another Great White Hope. This time he was greeted by hooting crowds and angry picketers. Demonstrators followed him, waving placards, shouting "Nazi! Nazi!" or making derisive stiff-armed salutes and yelling "Heil, Hitler!" Reporters asked him if he thought he was a member of a superrace, and what the Nazis would do if he lost the fight to a Negro—whether he would dare go back to Germany.

"I am a fighter, not a politician," he told them. "I am no superman in any way." But he knows that Americans have seen newsreels of his triumphal return to Germany after the first fight with Louis—the Teutonic hero's reception, the lunches with the Führer and other Nazi leaders, all that crowing about a "great Aryan victory." He also knows that the Nazi propaganda machine has put inflammatory words in his mouth, words he never spoke: "I would not take this fight if I did not believe that I, a white man, can beat a Negro." And, "The Negro . . . the black amateur . . . the dumb animal . . . will always be afraid of me." Like it or not, he appears to be wrapped tightly in a swastika, a representative of the "master race." The racial excesses and cruelties of the Nazi regime, and American memories of the slighting of Jesse Owens at the 1936 Olympics, continue to follow him around like accusing fingers.

When the fighters set out on the long walk down the aisle toward the ring, Schmeling is booed and has to cover his head with a towel because fight fans pelt him with paper cups, empty cigarette packs, even banana peels. Police climb into the ring and form a square to discourage the storm of airborne debris.

Referee Arthur Donovan calls the two fighters to the center of the ring, intoning the ritual instructions: no punching on the breaks, come out fighting, may the best man win. In his corner, Louis does a little toe dance, punching the air, then hitches up his trunks. Schmeling stands quietly, arms hanging at his sides, staring across the ring. He is unshaved, and his black beard, black hair and shaggy black eyebrows emphasize the whiteness of his skin. His face is expressionless. Gravel-voiced Clem McCarthy,

Whenever Joe won a fight, black Americans celebrated, as citizens of Harlem do here after his devastating victory over Schmeling.

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Schmeling beat Louis in first fight with right cross, even as Joe threw left jab.

the American radio announcer, and his German counterpart, Arno Helmers, fidget with their microphones, aware that legions of listeners out in the warm and distant darkness will in a moment hang on their every word. The crowd hushes, then inhales sharply as the bell rings.

The thousands of fans in the stadium and millions listening on the radio have been told to expect the greatest fight of the age. The striking change that in the past two years has begun to take place in much of white America's perception of the two contenders has moved the fight off the sports pages and into the social consciousness of the country. In the first meeting between Louis and Schmeling, the polarization of blacks and whites in the United States was dramatically evident: a great many white Americans cheered when the white German won. But now, as a result of the savage threat to decency and peace evident in Nazi Germany, for most Americans the fight, because of Adolf Hitler's special brand of racism, has become a symbolic showdown between us and them, between America and the enemy. Ironically, at a time when blatant racism was a pervasive part of American life, a young black man was being asked to prove the superiority of his country, to become, in fact, a national hero for all Americans. Just as it would for Schmeling, the fight clearly would mark Joe Louis' life ever after.

His full name was Joseph Louis Barrow. He was born May 13, 1914, the seventh of eight children, in an Alabama sharecropper's shack. Twelve years later in Detroit, Joe found himself living in an extended family that included Pat Brooks, his stepfather, and Pat's five children by a previous marriage. In those days, Southern blacks saw Detroit, with its automobile plants, as a kind of promised land of employment.

A product of the South's separate but unequal educational system, in Detroit he was put back with much younger children. Bigger even than kids his own age, he felt like a fool and withdrew into a protective shell of reticence that, at least in public, he maintained for years. His younger sister, Vunies, remembers, though, that "he talked plenty around the house, and even then he was quite witty."

Adds his son Joe Louis Barrow jr., born in 1947, "My aunts and uncles told me they were absolutely flabbergasted when he became a boxer because he was so quiet and peaceful. He was the most tranquil kid on the block, always disciplined, respectful of traditions and his elders."

The road to boxing started when one of Joe's teachers, showing an ability to predict the future she didn't know she possessed, told his parents, "He's going to have to make a living with his hands." The trade school where he studied carpentry had a gym, the gym had a boxing program, and Joe, returning the violin his mother had rented for him, had something he could do with his hands.

The scene shifts to April 1934. After winning the Golden Gloves light-heavyweight championship of Detroit and running his amateur record to 50 wins, 43 by kayo, against only 4 losses, Joe was introduced to a man named John Roxborough. The son of a New Orleans doctor, Roxborough had spent a year at the University of Detroit, but after sizing up the slim opportunities for black college gradu-

As Schmeling exults after first fight in 1936, Louis is counted out by referee Arthur Donovan. In career, Louis won 68, lost 3.

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ates in white America, he became a bail bondsman and soon, operating behind the front of a real estate office, ranked as king of the numbers racket in Detroit's black community. It was a position of considerable influence. He became, in fact, something of a civic leader, ready to help his less fortunate brothers and sisters, supporting such organizations as the Urban League, and doling out money to pay for the college educations of at least 30 promising young black men.

Roxborough thought Joe was ready to fight professionally and Joe, with his family's approval, soon moved into Roxborough's house to begin a sort of metamorphosis based on proper food and proper gym equipment, with some of his well-dressed benefactor's old suits altered to fit. Roxborough called in Julian Black, who had connections in the boxing world, and together they entrusted Joe to trainer Jack Blackburn, who had trained both a world champion bantamweight and lightweight.

To make up for Joe's lack of speed, Blackburn taught him the flat-footed shuffle that later became a Joe Louis trademark. He taught him how to throw punches in series with both feet firmly planted for balance, and how to take a punch the same way. Blackburn also brought to the 20-year-old novice some basic tactical truths: in a white man's world, he said, you never fight for a decision; the only sure way for a black man to beat a white man is to knock him out.

Louis celebrated the Fourth of July, 1934, by knocking out heavyweight Jack Kracken in Round 1 of his first professional fight. Managers Roxborough and Black voted to give him the entire purse—$50—saying, rightly enough, that he had earned it. By the end of that year, after an even dozen professional fights, his record stood at 12-0, all but two by kayo. The purses were getting bigger—$100,

James Cox writes frequently for SMITHSONIAN *on topics ranging from the Gipper to the Harvey Girls.*

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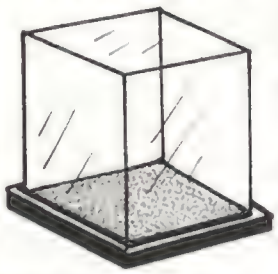

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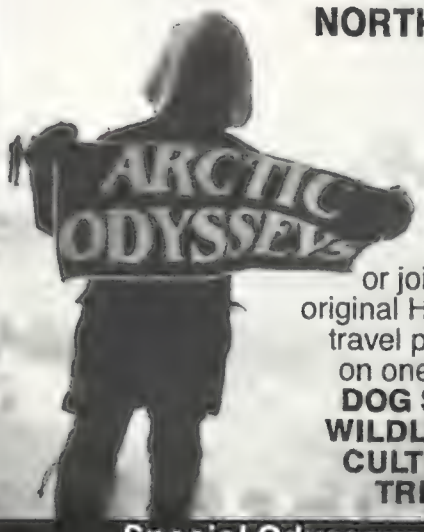

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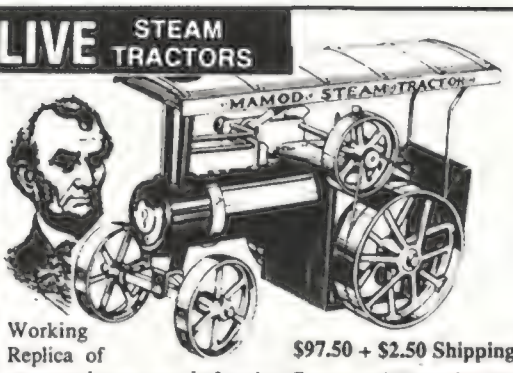

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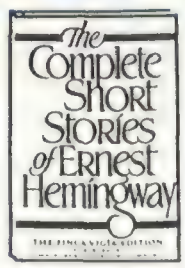

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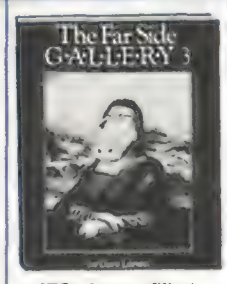

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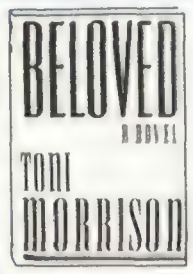

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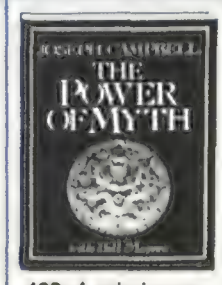

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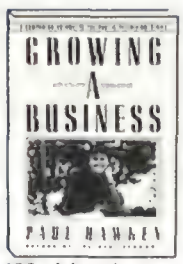

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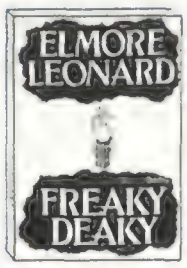

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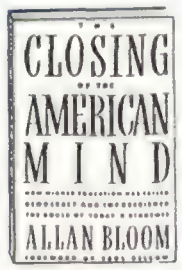

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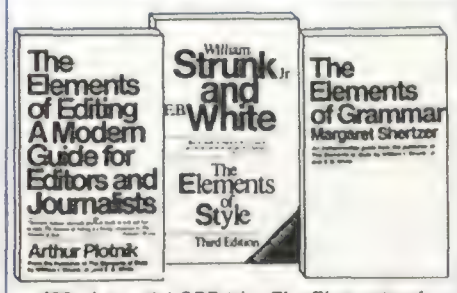
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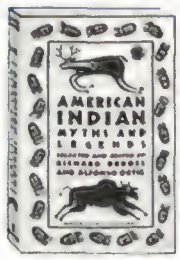

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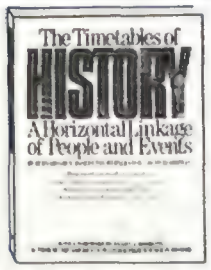

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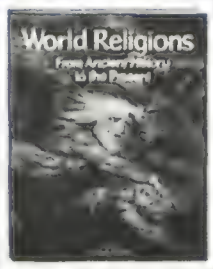

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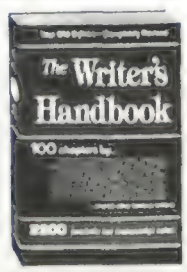

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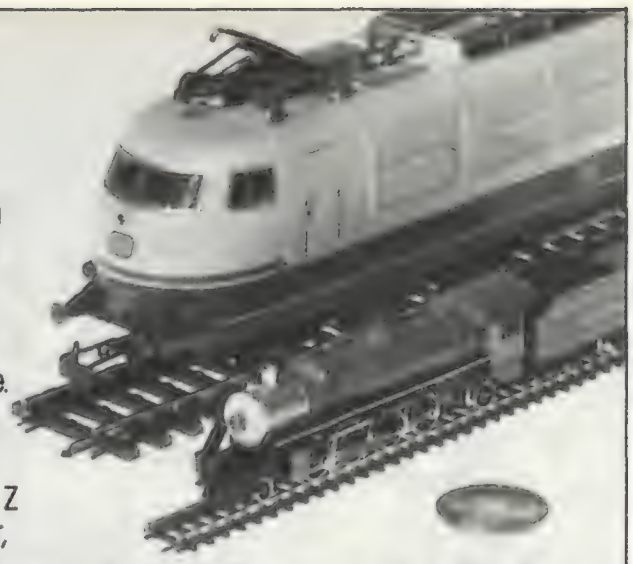

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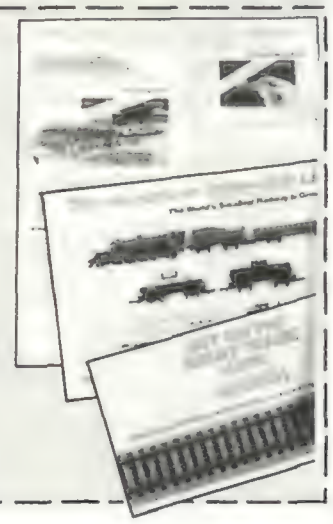

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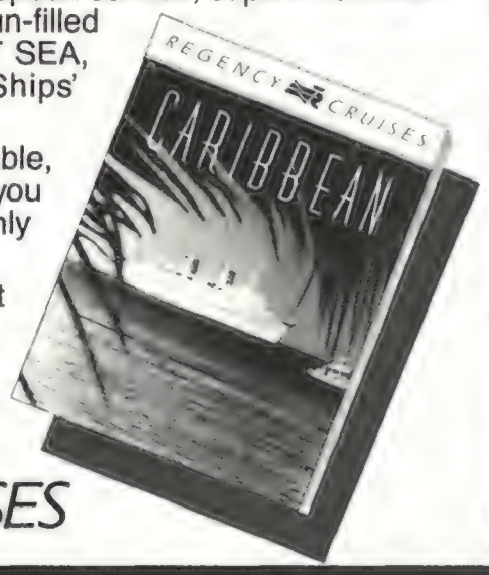

REGENCY CRUISES

$300, $450—and the boxing world began to take note. The sportswriters, as they would continue to do, dipped into their bags of purple prose, uncorking a flurry of alliterations to describe the new phenomenon: brown bomber, dark destroyer, sepia slugger, mahogany maimer, mocha mauler, shufflin' shadow, heavy-fisted Harlemite, even (good grief!) the coffee-colored kayo king. Often they likened him to a jungle killer, a stalking panther, seeing in the deadpan expression that was his ring face some kind of implacable bloodlust, just as they tended to read sullen stupidity into Joe's shy, monosyllabic answers to their endless, boring questions.

Later, as they started to sense his essentially peaceful nature, they decided Joe was a stereotypical "darkie," a man who would rather sleep than eat but who, when eating, could consume five chickens or a 12-pound turkey at a sitting. Appallingly, cartoonists followed suit, drawing Louis

with huge lips and a watermelon smile. Under the caption, "Use the word 'defeat,' Joseph," a New York *Evening Journal* cartoonist drew a lampoon image of Louis replying, "Sho. I pops 'em on de chin and dey drags 'em out by de feet."

Sportswriters of today rarely risk embarrassing themselves and alienating a large portion of their readership by stressing the peculiarities or irregularities of any athlete's speech—Casey Stengel, Yogi Berra and other "personalities" aside. But in the '30s they often quoted Louis in exaggerated Uncle Remus dialect and kept Schmeling's comments lively by putting them into burlesque-show German.

It was a time when most whites simply didn't deal with the sensitivities of black Americans. In the South, where Jim Crow still ruled, blacks could not go to school with whites, could not use the same bathrooms or drink from the same water fountains. In the North, black Americans were locked into crowded slums and out of restaurants, nightclubs, hotels, not to mention most labor unions. The white press virtually ignored more mainstream black leaders like A. Philip Randolph and W.E.B. DuBois. "To most white Americans," wrote Chris Mead, one of Louis' biographers, "blacks were invisible."

It had not always been so, at least in sports. In 1875, out of 15 jockeys riding in the first Kentucky Derby, 14 were black; by 1911, blacks were excluded. As everyone who has ever heard of Jackie Robinson knows, Major League baseball stayed off-limits to blacks until 1947. Football and basketball in the North offered tokenism; in the South, nothing. A black man represented the United States in the 400-meter event at the 1904 Olympics, but blacks were rarely seen again until 1932, when Eddie Tolan and Ralph Metcalfe made their marks, and 1936, when Jesse Owens ran the legs off his Aryan opponents in Hitler's Berlin. After Jack Johnson won the heavyweight title in 1910, he

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so antagonized white America (partly as a result of a flamboyant lifestyle) that "Great White Hope" became part of the national vocabulary. For 22 years, no black was allowed by the boxing fraternity to contend for the championship.

The specter of Johnson haunted Roxborough and Black. They developed a set of commandments for Joe Louis to live by: he was never to have his picture taken with a white woman; never to go anywhere, especially to nightclubs, without a carefully chosen entourage; never to gloat over a fallen white opponent; never to grin or show any kind of emotion in front of the press and their cameras. And he was to report immediately anyone approaching him about fixing a fight. Press agents working for Mike Jacobs and the 20th Century Sporting Club fleshed out the public image of Joe as a model of middle-class virtue, informing the world that he neither drank hard liquor nor smoked, that he read the Good Book every night before going to sleep (they got his mother to send him a Bible), that he was modest, generous and, in the words of his mama, "always a good boy."

All true enough, up to a point. Joe was a good-looking young man, who favored flashy cars and fine clothes—striped suits with wide lapels and broad-brimmed hats. As champion, he attracted women of all ages, colors and social pretensions. But he knew the meaning of the word "discreet." And in an age when journalism was willing to overlook the human foibles of Presidents and sports heroes, reporters treated the details of his private life as protected information. The sportswriters, in their patronizing way, wrote glowingly of how "well behaved" Joe was for a young Negro, often ending with the phrase "and a credit to his race."

He *was* a credit to his race, and at the time he gave the black people of America more popular pride in themselves than did all the black poets, black educators and black leaders put together. Blues singers didn't celebrate opera star Paul Robeson, scientist George Washington Carver or diplomat Ralph Bunche, but they made Joe Louis the paladin of their ballads. So did black kids in Harlem:

As an "Aryan hero," victorious Schmeling and his film star wife, Anny Ondra, were invited to lunch by the Führer himself.

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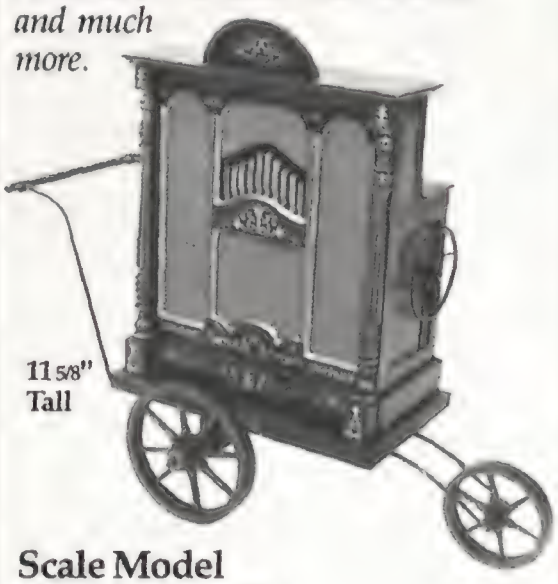
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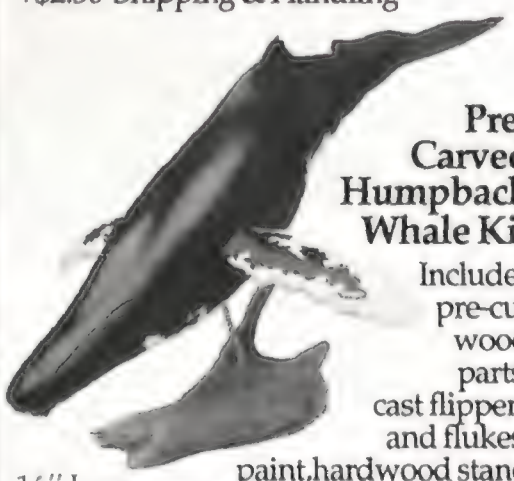
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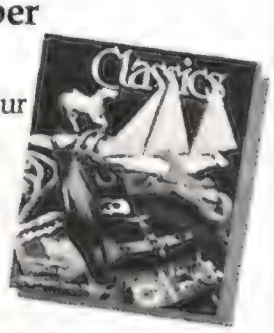

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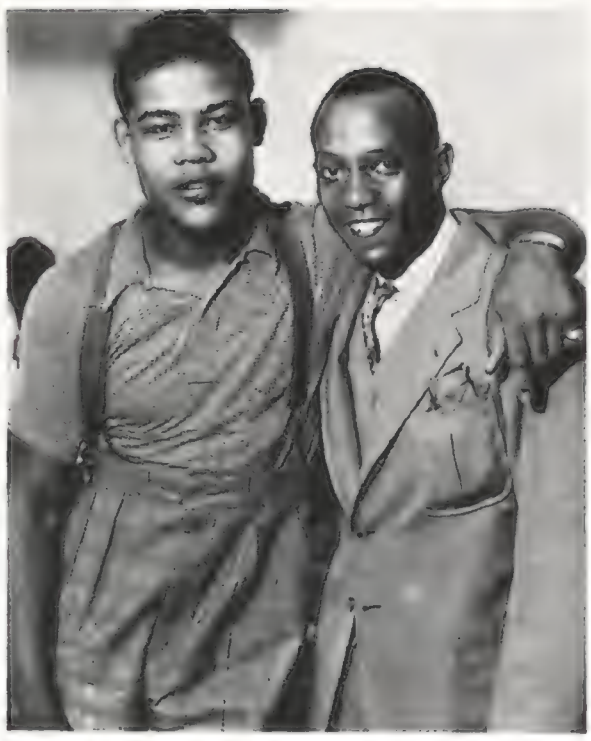

Joe posed with sprinter Jesse Owens, soon to dominate the 1936 Olympics.

Bob Pastor was on his knees,
Said, Joe
Don't hit me, please,
Just go truckin' out of the ring.

All across America, when Louis was fighting, blacks gathered by their radios to listen. When he won, in their joy at this taste of victory, they poured out into the streets to celebrate. "It was like a revival . . ." wrote Richard Wright. "Joe was the concentrated essence of black triumph over white."

In 1935 Joe won all 14 of his fights, 12 by knockout. On the evening of September 24, wearing a gray suit and white shirt without a tie, he married Marva Trotter, a beautiful young stenographer at the Chicago Insurance Exchange, then rode behind screaming police sirens to Yankee Stadium, where he put away long-armed, genial Max Baer in the fourth round. All in all, it was a good day's work: 88,150 fans in the ballpark brought the million-dollar gate back to boxing, and Joe's cut was a satisfying $240,833—at a time when a loaf of bread cost a dime and $25 a week was a good salary.

Joe was riding high. Max Schmeling, the former champion who looked a lot like Jack Dempsey and boasted a thunderbolt right, was on the comeback trail. A sailor's son from the

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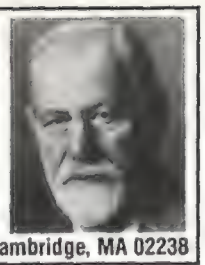

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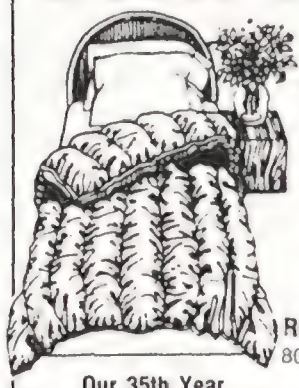

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tough waterfront of Hamburg, like Joe Louis, Schmeling had come far, fighting his way up first to the European heavyweight title and then, in 1930, to the world title. Late in 1935 he arrived in America to watch Louis fight a durable but ungifted Spaniard, Paolino Uzcudun. After the bout, Schmeling was said to have cryptically told the press, "I see somezing." The reporters laughed.

Maximilian Siegfried Schmeling was considered a "heady" boxer, quick to spot an opening in the ring and take advantage of it. But his heavyweight championship had been awarded to him as a forfeit after he had gone down from a below-the-belt foul by Jack Sharkey in the fourth round. And he soon lost the title to Sharkey in a rematch. When Max Baer knocked him out in ten rounds and Steve Hamas, a journeyman, took him on points, experts wrote him off. He returned to Europe and grimly won several solid victories. Still, in 1936 he was over 30 and the smart money figured he was finished.

When the two fighters faced each other for the first time, in Yankee Stadium on June 19, 1936, Louis hadn't fought in more than six months. But the oddsmakers and the white press favored Louis by a wide margin, and many favored him because Adolf Hitler and the Nazis, in power for three years, had outraged the world by stripping Jews of their property and legal rights. American Jewish organizations clamored for a boycott of this first fight, too. Germany's Nazi leaders feared that Schmeling, who had already been beaten by a Jew, Max Baer, would also lose to a black, another of the "inferior" peoples, but German interest in the fight remained high.

It was a grueling fight. In the early rounds, Louis jabbed Schmeling consistently, almost closing his left eye. But when he tried his hook, Schmeling's right smashed him on the chin. In the fourth, Louis tried the left hook again—and landed on the canvas. The "somezing" that Schmeling had seen was an opening for a right cross when Louis threw his left hook. Joe never

Though this Boston photograph was artfully posed, Joe in fact often worked with boys, teaching them how to box and how to keep fit.

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Joe got moral support from his mother. "Always a good boy," she said of him.

recovered, and after eight more brutal rounds Schmeling beat him with a flurry of lefts and rights. At the height of the pummeling Schmeling heard people in the fickle crowd yelling, "Kill him! Kill him!"

It was Joe's first defeat as a professional boxer, and the first time he had ever been knocked out.

A chorus of smug "told you so's" rang out from that part of the press and of the population only too willing to believe that the black symbol possessed a glass chin and a Jello heart. In black America, shock waves ran deep. And in his dressing room the cocky, young man-about-town wept like the country boy he still was. He was so embarrassed that he tried to hide his battered, swollen face behind a straw hat as he left the stadium.

Germany was ecstatic. Hitler cabled Schmeling, "Most cordial felicitations on your splendid victory." Propaganda Minister Joseph Goebbels crowed about a triumph for the "new youth" of Hitlerism. Less expected was the reaction in the United States. Hundreds of Americans actually sent Schmeling congratulatory telegrams, and a newspaper reported cheers in the gallery of the House of Representatives, in late session, when the result was announced. Schmeling was now the number one contender for a title fight with the heavyweight champion, James J. Braddock, and one sportswriter, noting that both fighters were white, commented, "May the best man win, but it doesn't make much difference now which one does."

A lot of people thought that Louis was a bubble that had burst. He set out to prove them wrong. Over the next eight months he fought and won seven times. Meanwhile, Braddock and Schmeling signed to fight for the championship. But Uncle Mike Jacobs, through some complex contractual sleight of hand, got Braddock's manager to dump Schmeling and agree to have Braddock fight Louis instead. And so it happened that on June 22, 1937, Braddock, a game and gritty veteran with a long history of broken hands, found himself on the canvas after a crushing right to the jaw. Joe Louis, at 23, was the new heavyweight champion—everywhere in the world except Germany.

The loss to Schmeling and the way the German had been cozened out of his shot at Braddock's crown did cast a large shadow over Louis' unchallenged right to the crown. Joe himself felt it. "I don't want nobody to call me champ," he said, "till I beat that Smellin'."

The rematch was one of the most eagerly awaited fights in history. The Depression was still on. The stock market was still floundering. Sales were down despite cut-rate prices: a new Ford V-8 for $535, a summer suit for $17.50, a fifth of Kentucky bourbon for $1.59. Government figures showed nearly eight million unemployed, and small-business men were screaming for repeal of Franklin D. Roosevelt's New Deal. For black Americans it was an appallingly hard time. In 1937 the U.S. Senate, after six weeks of Southern filibustering, once more failed to pass a federal anti-lynching law.

In Europe, Hitler had marched into the Rhineland, annexed Aus-

As a loser, Max Schmeling was drafted into paratroopers, then wounded. In an interview, he denied British troops were committing atrocities.

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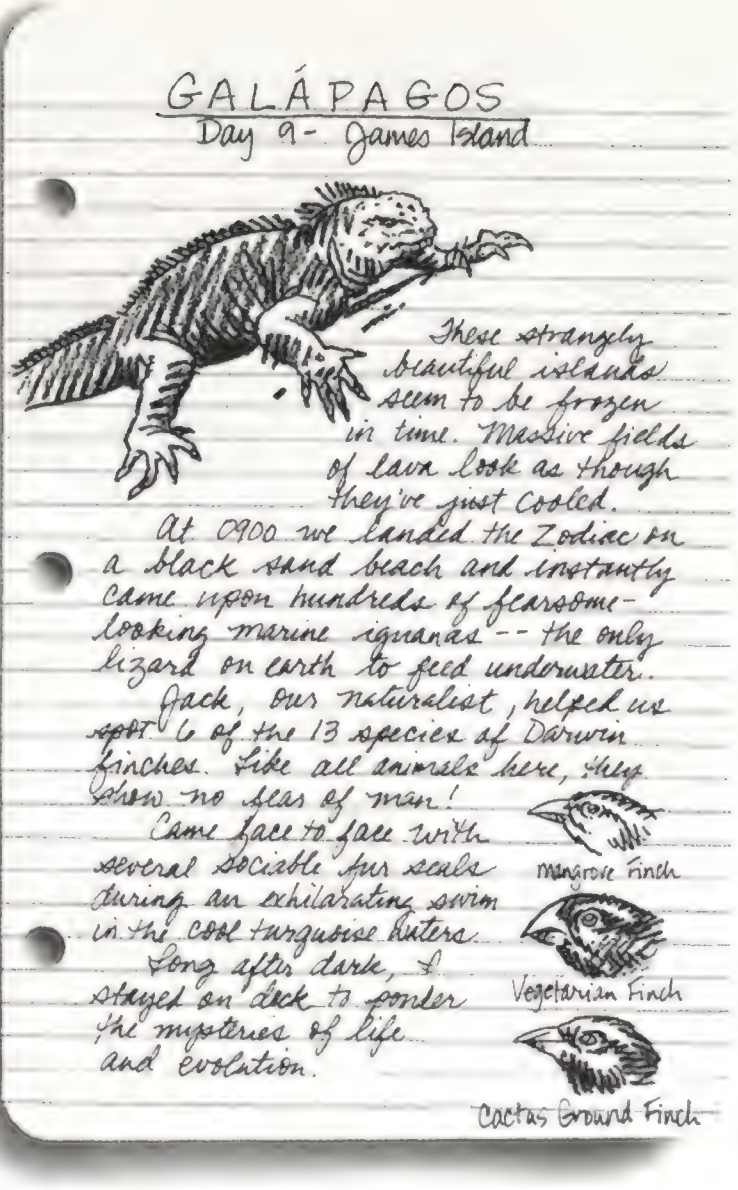
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In nightclub, Joe posed with glamorous wife Marva and "Joe Louis Punch."

tria unopposed and was stepping up his propaganda campaign against Czechoslovakia (SMITHSONIAN, October 1988). More and more Americans reacted with revulsion to reports of persecution of Jews and other "impure" peoples. They were angered by Hitler's snubbing of Jesse Owens—and America's other black track-and-field Olympic champions—as "America's African Auxiliaries." For most of America, "Nazi" was a dirty word.

Max Schmeling was not a member of the Nazi Party, but wherever he went in the United States, he was taunted by picketers and demonstrators. With Nat Fleischer, editor of *Ring* magazine, he prepared a radio message appealing to the sportsmanship of the American public, but no radio station would let him read it. The press stirred the pot, and the broth was kept bubbling by reports of messages to Max from Adolf warning him that he had better win for the greater glory of the Third Reich. President Roosevelt even got into the act. When Louis visited Washington with a black Elks convention, the President invited him to the White House. Roosevelt asked to feel the champ's arm and said, "Joe, we need muscles like yours to beat Germany."

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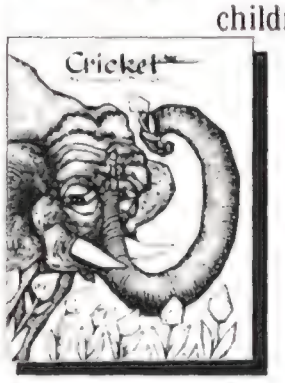

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Characteristically, the remark came out somewhat altered by the press: "Joe, beat Schmeling to prove we can beat the Germans."

At Schmeling's Adirondacks training camp, journalist Harry Sperber, a refugee from Nazi Germany, reported in a German-language newspaper that he had spotted a Nazi uniform hanging in the closet of Schmeling's trainer, Max Machon. With his sarcastic tongue and abrasive, imperious manner, Machon was no favorite of the American press. The story was quickly picked up and reprinted. On the eve of the fight, with the propaganda mills on both sides of the Atlantic working overtime, 18 American citizens were indicted in New York as spies for Nazi Germany. Louis-Schmeling II was no longer just a championship boxing match. It was a prelude to World War II.

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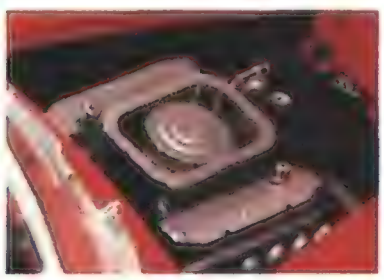

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After war, Sergeant Louis was decorated for work in Army camps and hospitals.

ing angel. A left jab, another, a left hook to the body, a left hook to the cheek that snaps the challenger's head back, a right to the jaw that sends him reeling into the ropes, then lefts and rights in triphammer flurries. Schmeling tries to turn away from the onslaught. A roundhouse right from Louis hammers into his back, cracking two vertebrae. Schmeling screams in pain. More lefts and rights rain down. Schmeling's knees buckle even as he clings to the ropes. Referee Donovan waves Louis into a neutral corner and starts a standing count. Schmeling pulls away from the ropes and Louis attacks again, as the crowd nears hysteria. The brutal barrage continues. After the fourth knockdown, Machon flings a white towel into the ring. But the traditional sign of surrender is unrecognized in New York. Donovan picks up the soggy towel and throws it to the ropes, where it hangs over the middle strand, and picks up the count from the official timekeeper. Max struggles to get up again, but it's all over. Mercifully, Donovan waves his arms and stops the fight."

In Germany, where it was 3 o'clock in the morning, fans listening to Arno Helmers missed the end of the fight. When Schmeling went down for the first time, Berlin pulled the plug. It could hardly have helped Max's state of mind to know that his beautiful movie star wife, Anny Ondra, had been invited to listen to the fight

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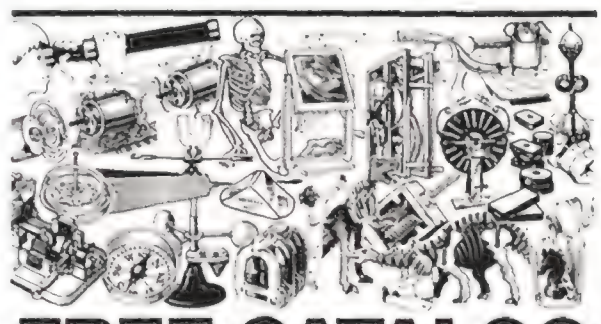

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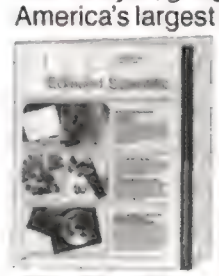

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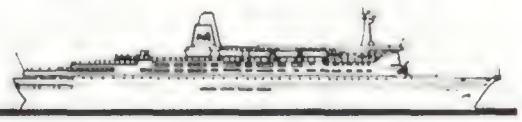

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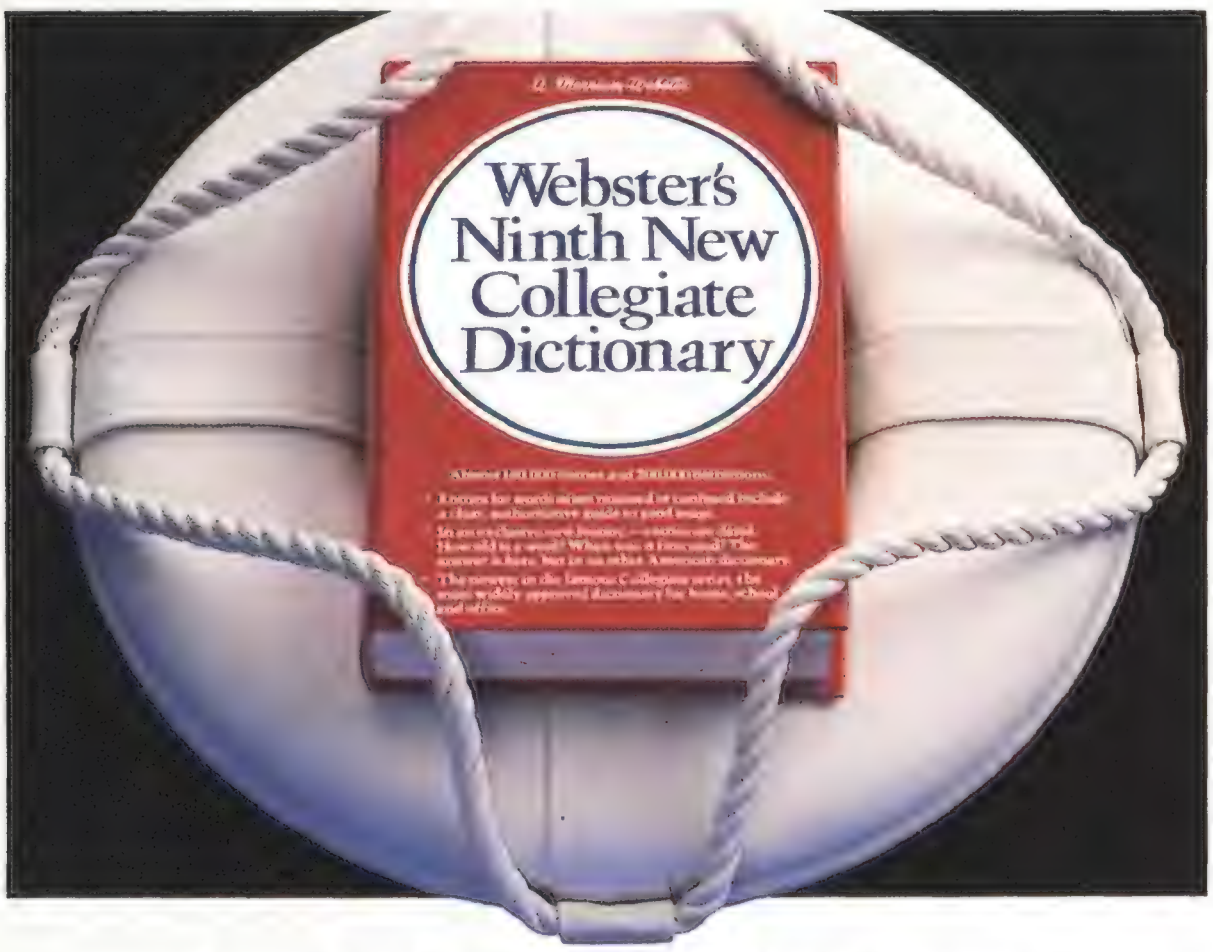

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in the apartment of Herr Goebbels.

In his dressing room, newsmen surrounded Louis. They tried to get him to say he hated Schmeling. He wouldn't. They wanted him to say he had disproved Hitler's theory of a master race. He said: "I'm sure enough champion now."

The press pressed for more.

"It was a good fight," said Joe.

"It didn't last long," a reporter quipped, as the others laughed.

"But it was good as long as it lasted," said Joe.

From coast to coast, the thousands listening to the "live from ringside" broadcast exulted. Not because a black man had beaten a white man, or vice versa, but because an American had beaten a Nazi. "What my father did," says Joe jr., "was enable white America to think of him as an American, not as a black. . . . By winning he became white America's first black hero."

The reign of Joe Louis as heavyweight champion had barely begun—he would retire undefeated 11 years later—but the second bout with Schmeling was the most memorable performance of his life, and for some people the greatest boxing match ever.

After war came in 1942, Joe joined the Army. When he volunteered, newsreels captured him in his new uniform, and audiences all over the country cheered his response after a reporter mentioned comments passed by Germans about racism in the United States. "There's lots of things wrong," Joe said. "Anybody knows that. But Hitler ain't going to fix them."

In the service, he risked his title twice for charity fights, and donated his purses to Army and Navy relief funds. Before one fight, he offered his most famous line: "We're going to do our part . . . and we'll win because we're on God's side." He meant to say, "God is on our side," but the country loved it the way it was. "Some people called him an Uncle Tom and criticized him for not being an activist," says Joe jr., "but that would have been out of

character for him." In fact, Louis was quietly instrumental in integrating football and baseball teams in Army camps. He risked going to the stockade for refusing to sit in segregated camp buses. Soon after that, in Army camps, discrimination was ended in sports, recreation and transport facilities.

At war's end, Joe went back to the ring. Then, after he retired, the IRS came after him for back taxes he didn't know he owed. The aging former champ fought and lost, and had to turn to the buffoonery of the wrestling circuit to earn some money.

It is a measure of Joe's character that he maintained good relations with all three of the women whom he eventually married, and with most of the men he fought and defeated. Max Schmeling, among others, became a fast friend.

In 1977 Joe Louis suffered a massive heart attack, but survived to get around in a wheelchair. Many friends were on hand on Saturday night, April 11, 1981, when he was wheeled up to Caesar's Palace in Las Vegas to watch the Larry Holmes-Trevor Berbick championship fight, and the 4,000 people in the audience stood up and cheered. The next morning he

Max Schmeling today is a successful Coca-Cola distributor in Hamburg.

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Louis and Schmeling later became friends, appearing together as an after-dinner attraction. Here they ham it up in 1973.

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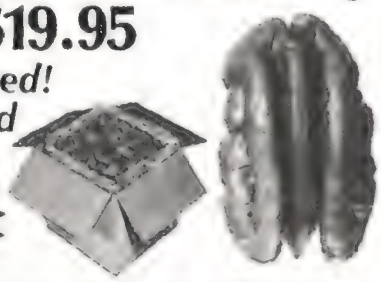

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collapsed in his home and died of cardiac arrest. He was 66 years old.

Max Schmeling is still alive—he's 83. But those 124 seconds in Yankee Stadium changed his life in many ways, a good deal of it for the worse.

Uneasy with his propaganda role and master race image, he had managed to decline a dagger of honor offered him by Hitler, without enraging the top Nazis. After the 1938 defeat, however, he returned to Germany in disgrace and the Nazi hierarchy enforced the silent treatment. His name disappeared from the press. "For Hitler and Goebbels," Schmeling recalls now, "I didn't exist anymore." "But in fact," he adds, "the defeat had its good side. A victory would have made me a 'parade Aryan' of the Third Reich."

As a famous athlete he also might have looked forward to a purely ceremonial role in World War II. As it was, when the shooting started, while only those in their early 20s or younger were being taken, he was called up at age 34 and assigned to the paratroops. He saw action only once, jumping into Crete in May 1941, and was injured soon after. News agencies in the West reported him killed, but he was in a hospital in German-occupied Athens; to show up the inaccuracy of the Western press, Goebbels ordered Schmeling to give an interview to Allied journalists.

The result was not what the Propaganda Minister wanted. Schmeling flatly denied German reports of British atrocities in the sector he fought in. When asked about the prospects of a war with the United States, he replied, "I would regard that as a misfortune. I've always thought of America as my second home." Goebbels was so mad he tried to prosecute Schmeling in the "people's court" in Berlin, but as a soldier Max was under the jurisdiction of the military justice system. A panel of officers threw Goebbels' case out of court.

At war's end Schmeling was broke. Like Louis he fought too long, until age 43, and like Louis he was reduced to refereeing. He finally put enough

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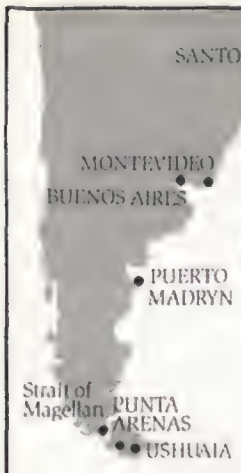

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cash together to buy a piece of land in Hollenstedt, south of Hamburg, where he still lives, now a prosperous Coca-Cola distributor. In 1954 he made the first of many postwar visits to America and made friends with Joe Louis. As fight celebrities, the two men even became an after-dinner banquet attraction together. "You know," Schmeling told a recent guest, "he visited me here before he died. He sat right in the chair where you are sitting." As the years pass, Schmeling's celebrity has done him some good. In a recent poll to pick the German athlete of the century, he edged out tennis phenomenon Boris Becker.

Says Schmeling, "Fifty years is a very long time."

The funeral of Joe Louis was splendid, a cross-country dual card touched by panache and patriotism, a show-business event at one end and, at the other, a belated thank-you from a government that could have treated him better when he was alive.

It started in Vegas with the pizzazz he had learned to enjoy: a copper casket wreathed in flowers, in the center of a boxing ring at Caesar's Palace. A crowd lining up out front before 8 A.M. Scores of celebrities from the boxing and entertainment worlds; a few words from Frank Sinatra; a song, "For the Winners," from Sammy Davis jr.; a eulogy from the Rev. Jesse Jackson. A few days later, across the country in Arlington National Cemetery, a nondenominational memorial service in the Fort Myer chapel. Throngs lined the way as a horse-drawn caisson carried the casket, now covered with an American flag, to a freshly dug grave down the hill from the Tomb of the Unknowns. A message from President Reagan, delivered by Secretary of Defense Weinberger. A 21-gun salute from a military honor guard. A bugle sounding taps.

And from somewhere in the crowd, the incongruous clanging of a cowbell.

"Time for a low profile, brother," a soldier whispered fiercely to the wielder of the bell, a young black man.

"We been low-profile for a long time, brother," answered the young man. "This is the bell of Liberty, rung for Joe Louis."

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At his death in the spring of 1981 at age 66, Joe Louis was mourned by the nation, buried in state at Arlington Cemetery.

Could a cat that eats supermarket pet food take this test and land on its feet?

1. Feel skin and coat.

Comb your fingers through the hair. Is it:

A. Healthy, vibrant and free of flaky deposits. 30 pts.

B. Dry, lackluster and poorly elastic. 5 pts.

C. Very oily, smelly, or uneven. 0 pts.

There are normal variations in different breeds of cats at different times of the year. However, poor nutrition always adversely affects skin and hair.

2. Inspect mouth.

Raise your cat's upper lip to view the teeth. Are they:

A. Clean, white and glistening. 20 pts.

B. Yellowed with signs of residue. 5 pts.

C. Decaying with evidence of tartar. 0 pts.

Diet plays a major role in oral hygiene. If you didn't check A, chances are you feed your cat a steady diet of wet foods, which can result in dental problems. Dry foods help cleanse teeth and gums.

3. Monitor appetite.

Does your cat eat:

A. Many times a day from a single serving. 20 pts.

B. Once a day. 5 pts.

C. Once every other day. 0 pts.

Many feedings a day are preferable because it allows for more efficient digestion and utilization of food.

However, if your cat suddenly changes eating habits, consult your veterinarian. It could indicate a health problem.

4. Examine stool.

Stool size, consistency and odor are good indicators of a cat's overall well-being. Is it:

A. Small, firm and free of any unusual substances and odors. 30 pts.

B. Large, hard with an offensive odor. 5 pts.

C. Very large, soft, with an offensive odor. 0 pts.

Stool volume is largely influenced by undigestible foods and enzyme deficiencies.

Small, firm stools demonstrate your cat has properly assimilated all the essential nutrients.

Stool consistency indicates the quality of your cat's source of nutrients. Stool from a poor source may be soft.

A hard stool can represent a mineral or fiber imbalance.

Stool odor is usually traced to grain-based cat foods sold in supermarkets.

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By Donald Dale Jackson

While he expected the worst, Nobel hoped for the best

The inventor of dynamite was a gloomy skeptic who left a legacy that honors achievement

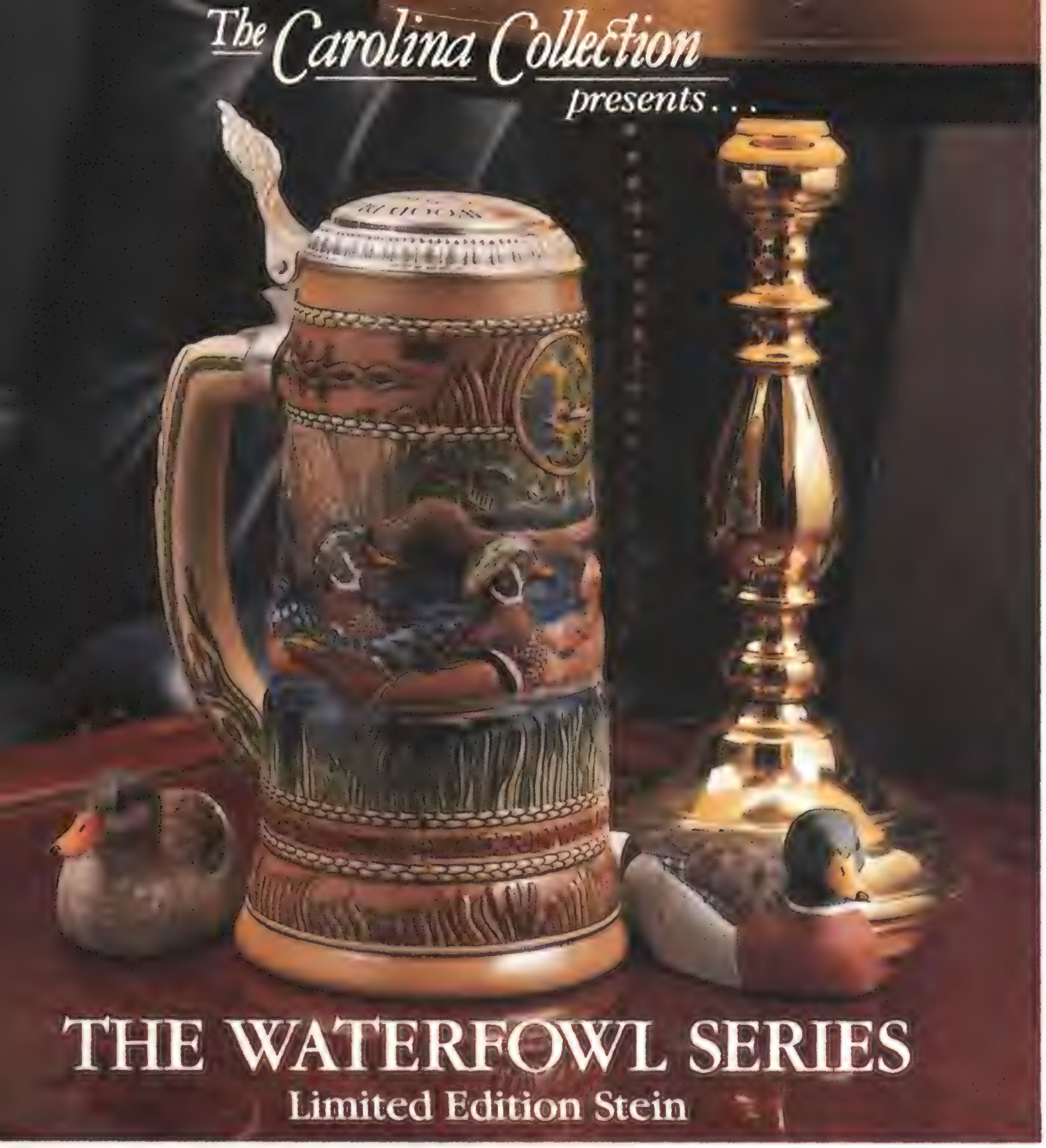
Alfred Nobel appeared characteristically melancholy in a rare photograph taken not long before his death in 1896.

The advertisement in a Vienna newspaper in the spring of 1876 was intriguing: "A very wealthy, cultured, elderly gentleman living in Paris desires to find a lady also of mature years, familiar with languages, as secretary and manager of his household." Bertha Kinsky, an attractive, 33-year-old Austrian aristocrat down on her luck and working as a governess, may have detected the loneliness between the lines in the ad she answered, and she soon became aware of a certain disingenuousness as well. The man who placed the ad was indeed wealthy, cultured and multilingual, but at 43 he was hardly elderly. And when they met in Paris shortly afterward, it appeared to Bertha that in his shy and courtly way the gentleman was looking for more than just a secretary—perhaps a wife.

But Bertha, alas, was already in love, and she said as much when her new employer asked if she were "fancy free." After just one week on the job she rushed back to Vienna and eloped. But she never forgot the kind and melancholy Parisian she might have married—his wit and sparkling conversation, his wary self-deprecating personality, and the way he could be by turns enchanting, moody and even despairing. Alfred Nobel was unlike anyone else she had ever met.

They remained friends until his lonely death 20 years later in the villa on the Italian Riviera whose name he had changed from "My Nest" to "Villa Nobel" when someone pointed out that it took two to make a nest. He never married. Baroness Bertha von Suttner was a world-famous writer and pacifist by the time Nobel died and she may have had a role in his decision to add a prize for peace to the awards for science and literature he established in his will. There was a tidy symmetry in that Bertha won the 1905 Nobel Peace Prize for her tireless crusading.

Bertha described Nobel as "rather below the medium height, with [a] dark, full beard, with features neither ugly nor handsome." As a young man he was square-faced and heavy-browed with lively, intelligent blue eyes. As he grew older his characteristic expression became distracted, al-



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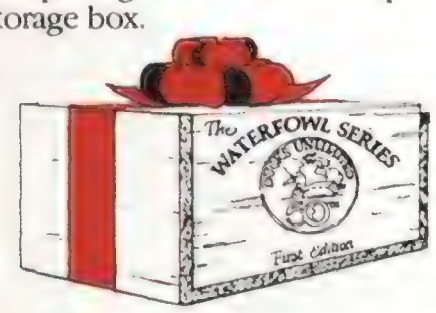

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Bertha von Suttner, who worked briefly as Nobel's secretary, won Peace Prize.

most dreamy. He had little interest in sitting for portraits and less in being interviewed; he called reporters "two-legged plague microbes." He shunned any kind of self-display, though he dressed well, and he always remained aloof from employees and associates. "He was a stickler for etiquette, and any personal approach [by his servants] was unthinkable," wrote a man who knew him well.

Alfred Bernhard Nobel was a scientific genius who invented dynamite and the blasting cap, and amassed one of the great fortunes of 19th-century Europe—the basis for the celebrated prizes he endowed. He was a gracious and sensitive sophisticate adored by his mother and admired by almost everyone else who knew him. Yet something in Nobel never quite meshed, something made him sad and bitter and ill at ease with himself. Serenity eluded him.

Nobel blamed his blackest moods on the "spirits of Niflheim," mystical dwellers of the far north in his native Sweden. The spirits must have

The author has never received a Nobel Prize and doesn't expect to; his mother, however, remains hopeful.

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possessed him when he wrote this grim capsule autobiography: "Alfred Nobel—his miserable existence should have been terminated at birth by a humane doctor. Principal virtues: keeping his nails clean and never being a burden to anyone. Principal faults: that he has no family, is bad tempered and has a poor digestion. One and only wish: not to be buried alive. Greatest sin: that he does not worship Mammon. Important events in his life: none. . . ."

The life he dismissed in those harsh lines was in fact rich in family loyalty and personal achievement as well as Mammon's rewards. Born in Stockholm in 1833, Alfred was the fourth son of Immanuel Nobel, a mechanically gifted if somewhat erratic builder-inventor whose career was a roller coaster of soaring triumphs and disastrous plunges. His mother, Andriette, was the family anchor, a good-natured woman who ran a small food shop during the hard times. When Immanuel's business in Sweden collapsed, he tried again in Finland and then in Russia, moving the family to St. Petersburg in 1842 (when Alfred was 9) after establishing himself there

Nobel's mother, Andriette, was 86 when she sat for portrait. Alfred adored her.

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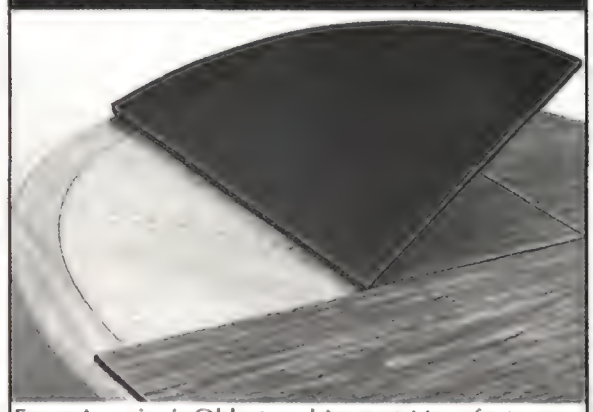

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His father, Immanuel, felt one-upped when Alfred invented nitro blasting cap.

as a successful manufacturer of land and sea mines (p. 208), steam engines and other machinery. Immanuel's fortunes plummeted once again when the Russian government canceled his factory's contracts in the late 1850s. He went home to Sweden and to the pursuit of a growing fascination with the practical applications of a volatile compound discovered 14 years earlier —nitroglycerin.

Alfred, a sickly child who suffered from a spinal ailment and other maladies, showed an early aptitude for languages while acquiring a catch-as-catch-can education—a year of school in Stockholm, tutors in Russia, and two years of travel and study between the ages 17 and 19 in France, Italy, Germany and the United States, where he spent some time in New York. Despite his frailty he was a diligent worker, praised by his father as "my good and industrious Alfred." As he matured he came to define himself in terms of work; "work beautifies everything," he once wrote.

But the youthful Nobel learned that there was more to life than work, especially in Paris. There he fell briefly and poignantly in love. The only evidence is a poem—he wrote plays and novels as well as poetry at different times in

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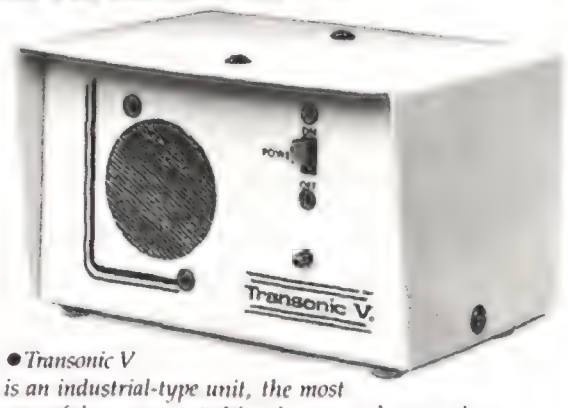

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Nobel *père* painted a watercolor to show how his mining system was deployed at Finnish ports on behalf of the Russians during Crimean War.

his life—that chronicles a romance that blossomed "till we had grown to be / A heaven to one another." They might have shared "the joys and griefs of wedded life"—his missed connections started early—but, suddenly and inexplicably, the girl died. In his grief Nobel resolved to spurn pleasure and embrace "noble duties."

In the 1850s, he apprenticed at his father's St. Petersburg plant along with his brothers Ludvig and Robert, and the three stayed on in Russia after their bankrupt father returned to Sweden. Alfred, the family's best linguist, had been sent to London and Paris in 1858 in a doomed attempt to borrow money. He also emerged as a chemist during this time (he received his first patent in 1857) and shared his father's interest in nitroglycerin. In 1863, Alfred heeded a summons from his father to join him in Sweden. The breakthrough that launched the Nobel name and fortune—while lifting mankind's destructive capacity to a new level—came within months.

What Alfred did—and he was later at pains to point out that the achievement was his and not his father's—was solve the problem of how to detonate nitroglycerin. The compound's tremendous explosive force was known, but no one had devised a way to manufacture or handle it for use in mining, tunnel building and other construction. Nobel's inspiration was the blasting cap, in which a charge of gunpowder (later, fulminate of mercury), ignited by a fuse, detonated a connected container filled with liquid nitroglycerin.

The Nobels and a small crew, including Alfred's younger brother Emil, who was still in school, began making detonators in a laboratory outside of Stockholm in the autumn of 1863. One morning a year later, while Alfred was off meeting an investor and his father was still at breakfast, the lab burst into flames and exploded, killing 21-year-old Emil Nobel and four others. The senior Nobel, badly shaken, suffered a stroke a month later from which he never fully recovered. Alfred, still confident in his invention despite the catastrophe, went ahead with plans for factories in Sweden and Germany. Adopting a canny practice he would follow when he set up plants throughout Europe and America, he ex-

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changed his patent rights for a share in the foreign business.

The Stockholm explosion turned out to be the first in a series of fatal blasts that nearly ended the nitroglycerin industry before it began. Because of its tendency to decompose, liquid nitro was more dangerous to store or transport than Nobel or anyone else realized. A ship carrying crates of it blew up off the coast of Panama in 1866 with a loss of 74 lives. Less than a month later, 14 died in a blast at a San Francisco warehouse. Nobel's factory near Hamburg was leveled by an explosion within a year of its opening, and there were other disasters in New York and Sydney, Australia.

Nobel went back to the lab to puzzle out a solution. He needed a solid, powdered or fibrous material that would absorb the nitro and thus reduce its tendency to go off. He settled on a sandlike substance called kieselguhr, which was both porous and absorbent, and chemically neutral. Mixing it with nitroglycerin produced a compound that was somewhat less potent than liquid nitro but safer to handle, and could be packaged in paper-wrapped sticks. Nobel named it

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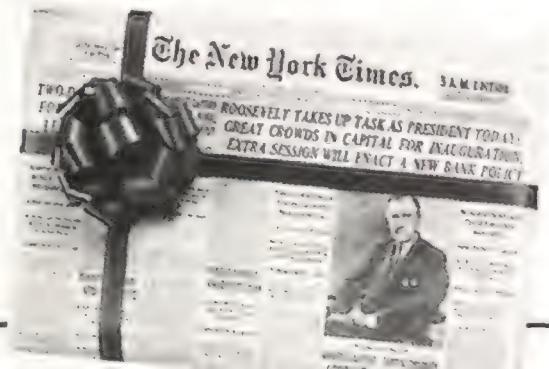
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Dynamite became the world's favorite explosive almost immediately. Explosions in warehouses and storerooms subsided. Nobel and his partners erected factories in Norway, Finland, Scotland, France, Italy, Austria-Hungary, Spain, the United States —wherever engineers solved problems by blasting. The profits cascaded in: the British dynamite company alone paid annual dividends to its shareholders (including Nobel) of between 12 and 20 percent for ten years. The output of Nobel's plants increased from 11 tons of dynamite in 1867 to 3,120 tons seven years later.

Though he spent much of his time securing patents and contracting for new factories, Nobel was less interested in the ledgers than in the lab. He was an idea man, happiest with his beakers and test tubes, slipping out of the lab at night by a side door. "If I have a thousand ideas a year, and only one turns out to be good, I'm satisfied," he said, but in fact his success rate was considerably better than that. The number of Nobel patents eventually reached 355.

He followed up the invention of dynamite by developing the even more potent solution called blasting gelatin, and in the 1880s he patented an almost smokeless gunpowder that European armies rushed to buy. His scientific interests ranged beyond explosives. He experimented with artificial substitutes for silk, leather and rubber, and zeroed in on the idea of aerial photography for mapmaking (p. 216). Nobel anticipated the Wright brothers and the 20th-century preoccupation with the atom ("Its form, movements and destinies," he wrote, ". . . occupy my thoughts more than they decently ought to").

By both nature and necessity Nobel was cosmopolitan, fluent in six languages and a man at home in most European capitals. After beginning his business career, he settled first in Hamburg, later and for the longest period in an elegant house in Paris, finally in his villa in Italy. He traveled

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often on business or to visit spas for various treatments, and in his final summer spent time at a house he bought in Björkborn, Sweden. The French writer Victor Hugo called him "the millionaire vagabond," and in bleak moments Nobel lamented the cost of his lifelong wandering. "I drift about without rudder or compass, a wreck on the sea of life," he wrote to his sister-in-law. "I have no family to furnish the only kind of survival that concerns us; no friends for the wholesome development of my affections, or enemies for my malice."

Nobel indulged himself in a taste for racehorses but bet sparingly. He eschewed alcohol, tobacco and cards. Although his personal style was spartan, he took pride in entertaining well, providing what one guest called "the perfect appointment of his table and cellar." In addition to a laboratory at his Paris house, he had a coach house, a stable and a conservatory. The father of dynamite must have had a low tolerance for noise because he wrapped rubber around the wheels of his carriage to muffle the sound. A rare journalistic glimpse of Nobel gliding through the night in silence broken only by the clip-clop of the horses reveals also that his cab was furnished with inventor's touches—an intercom for communicating with the coachman, and an electric interior light.

Nobel did his own thinking, which led him to political and religious opinions that departed from the orthodoxies of his time. He seemed profoundly dubious about all forms of government. In his various writings, the stance he strikes most often is that of the man who veils his illusions, and hopes for the best while expecting the worst. Yet the same man also would specify that his Prize in Literature should honor "outstanding work of an idealistic tendency," and in his Peace Prize would create what may well be the world's best-known symbol of goodwill and brotherhood.

The most haunting leitmotiv in Nobel's life was his unsuccessful quest for love. Psychoanalysts might speculate that his mother spoiled him for other women. Andriette and Alfred were devoted to each other; he returned to Sweden each year on her birthday, and she alone was allowed

In the spacious laboratory at his Italian villa, Nobel invented a rocket for sea-rescue work and made improvements in firearms.

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Picture was taken by Nobel's rocket camera with shutter fuse (bottom right).

to call him "Bernie" (for his middle name). He was 56 when she died. She had loved him, he reflected, "as people do not love nowadays, when feverish life serves as a check on sentiment."

Women baffled, enchanted and even repelled him—"the fair, but usually repulsive sex," he once called them—but in his timid and elaborately courteous fashion he was always interested in them. Not long after Bertha Kinsky ran home to her Austrian swain, he began a relationship with a 20-year-old girl he discovered working in an Austrian flower shop. Her name was Sofie Hess, and she would become both the brightness and the most exasperating burden of his last two decades.

Nobel installed Sofie first in a Vienna apartment, later in a Paris retreat and finally in a villa at a German resort town. He established a bank account for her. He wrote her letters addressed to "My dear sweet little child" and signed them with her pet name for him, "your old *Brummbär*," which translates as "growly bear." Nobel envisioned a Pygmalion-like alliance in which he would transform

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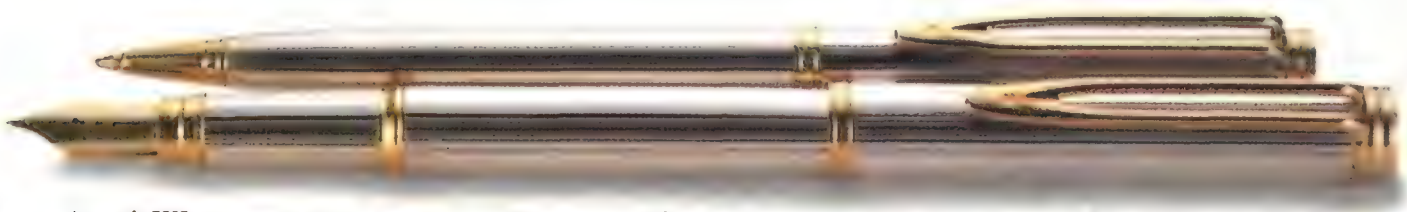

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her into a cultivated and elegant lady, but Sofie was more interested in clothes and expensive amusements. A friend of Nobel's described her as "gay, capricious, somewhat frivolous . . . ungifted and indolent." Nobel fussed at her in letters and made several half-hearted attempts to end the affair; the grasping Sofie scandalized him by calling herself Madame Nobel. She eventually became pregnant by another man and married him, but Nobel continued to support her.

Nobel had the bizarre experience of reading his own obituary when his brother Ludvig, who had stayed in Russia and become another family success by developing the hugely productive Baku oilfields in the Crimea, died in 1888. A French journalist who mistakenly identified the deceased as Alfred described him as "the merchant of death." Some believe that this chilling incident turned Nobel into more of a pacifist than he had been before; he became steadily more interested in world peace.

He had defended his work in various ways over the years, to himself as much as anyone else. He had opposed war all his life as "the horror of horrors and the greatest of all crimes," and yet declared that some loss of life was inevitable with any explosive, even when its main purposes were beneficial. When he was working on smokeless powder, which was indisputably a weapon of war, he acknowledged that it was "rather fiendish" but explained that the theoretical problems involved fascinated him. He supported Bertha von Suttner's involvement in the European peace movement in the 1890s, though he told her that in his opinion "My factories may make an end of war sooner than your congresses . . . because the day that two armies have the capacity to annihilate each other within a few seconds, it is then likely that all civilized nations will turn their backs on warfare."

Nobel moved from Paris to Italy in 1891, propelled by the fury of the French after the revelation that he had sold his smokeless powder to other nations. He continued experimenting with explosives and synthetics in his seaside villa at San Remo, though he was suffering from heart disease.

Sails furled, Nobel's 39-foot yacht rested at anchor. Inventor was interested in aluminum, so he had the hull made of it.

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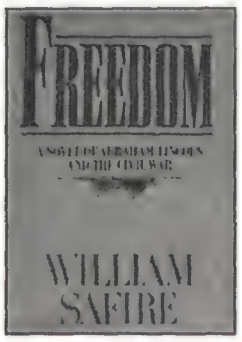

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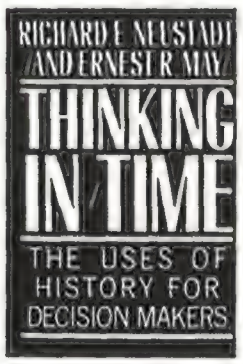

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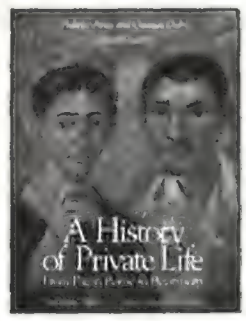

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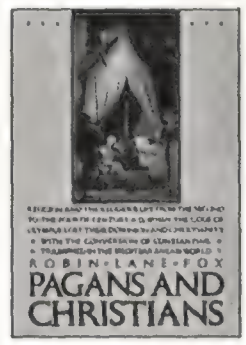

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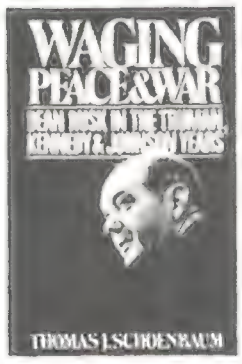

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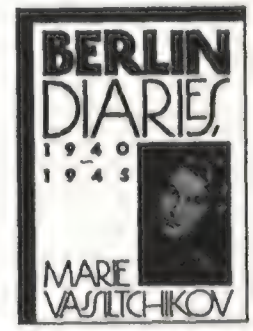

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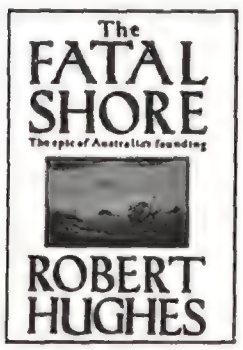

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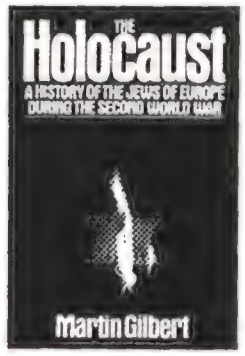

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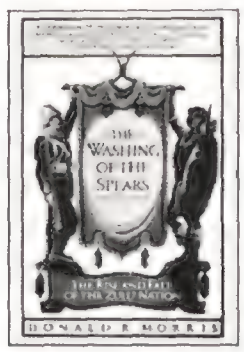

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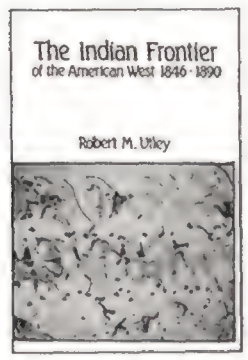

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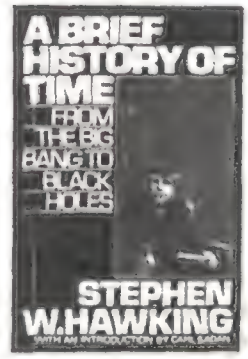

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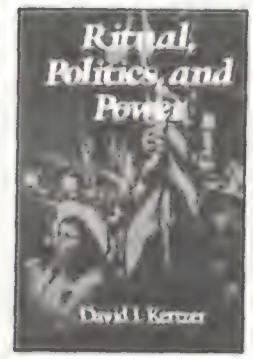

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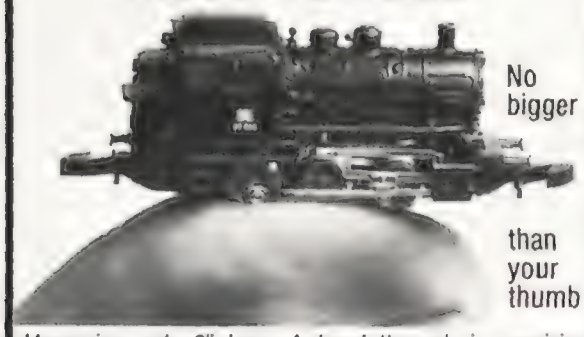

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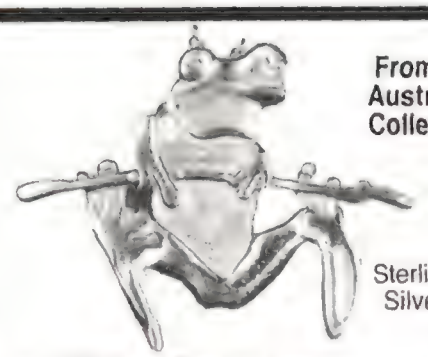

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In several letters he gloomily forecast his own end, "surrounded only by hired servants and without any dear one close by." In October 1896 he reported that his doctors, ironically, were prescribing nitroglycerin medicine for him, though they called it by another name. Not long after that, he suffered a cerebral hemorrhage. For the next three days he could speak only haltingly and only in Swedish, which his servants could not understand. A butler found him dead on December 10, 1896.

Nobel had written a will, without benefit of lawyers, a year earlier. He believed that inherited wealth created dullards, so his bequests to friends and relatives were small. The will directed his executors to convert all his remaining property to cash (it came to roughly $9 million) and to invest it in "safe securities," the interest from which would be awarded annually in five prizes to "those persons who shall have contributed most materially to benefit mankind" during the preceding year. The five categories were physics, chemistry, physiology or medicine, literature and peace. (A prize for economics was added in 1968.) The will named the institutions that would

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select the winners: the Royal Swedish Academy of Sciences, for physics and chemistry; the Karolinska Institute, for medicine; the Swedish Academy, for literature; and the Norwegian Parliament, for peace. The last paragraph of this remarkable document declared that after competent doctors had confirmed his death (an echo of his old fear of being buried alive), he wished to be cremated.

It took more than three years for the legal dust stirred up by Nobel's testament to settle. By 1900 the machinery was finally in place for selection of the first Nobel Prize winners, who were named a year later. Close to 600 Nobel laureates have now been recognized.

Though criticism of both the selection system and the individual choices has increased over the years, the prizes retain a lofty eminence unmatched by any other honor: to be a Nobel winner is to be recognized as the best. The prizes reflect Alfred Nobel's enthusiasms—laboratory science, literature, peace—and also his international perspective. Their extraordinary prestige may well derive from his vision of what Harvard historian Donald Fleming

Russian novelist Boris Pasternak was unable to accept his 1958 Nobel Prize.

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California carpet cleaner Donald O. Cram (left) laughed after being mistakenly told he'd won 1987 Nobel Prize in Chemistry. Real winner, the chemist Donald J. Cram (above), celebrated.

called "the harmonious world community that cannot seem to get born but clearly must."

The selection process begins when letters soliciting nominations are sent each fall to hundreds of academics, previous winners and other leaders in the prize categories around the world. Committees at the awarding institutions begin screening the nominations the following February and commission detailed reports on the short list of prime contenders. The committee members confer frequently before their final recommendations are made and are approved by the parent organizations. (A parliamentary committee now makes the final decision in choosing the Peace Prize recipient—for 1988, the U.N. Peace-keeping Forces.) Winners are announced in the fall and given their prizes at galas in Stockholm and Oslo on December 10, the date of Nobel's death. This year each award will be about $382,000.

Critics have faulted the prize-givers for rewarding people whose best work is behind them rather than those who could use a boost; Nobel told a witness to his will that his aim was to help promising talents become independent. George Bernard Shaw, the 1925 Literature laureate, called the prize "a lifebelt thrown to a swimmer who has already reached the shore." Others fault the Nobel Foundation for its "rule of three" that limits the number who can share any one prize. "It doesn't jibe with modern science," says Columbia University sociologist Harriet Zuckerman, the author of a study of American science laureates. "Important experiments are almost always group enterprises."

The imposing list of Literature losers has drawn the most persistent carping, and indeed the profusion of great writers among the missing is in hindsight astonishing: Tolstoy, Twain, Ibsen, Strindberg, Chekhov, Joyce, Proust, Hardy, Conrad, Dreiser, James. Mahatma Gandhi never won the Peace Prize, but Theodore Roosevelt and Henry Kissinger did. A Danish scientist who won the Prize in Medicine drew the wrong conclusions from his research, and a German won it for developing a tuberculosis serum that proved fatally defective. Politics also intrudes on the Nobel grandeur: in 1937 Hitler barred Germans from accepting the award after the Peace Prize was won by a jailed anti-Nazi writer, and Russian author Boris Pasternak had to decline the prize after being criticized by the Kremlin.

Writers, predictably, have accounted for much of the silliness that sometimes attends Nobel occasions. Indian poet Rabindranath Tagore, who won in 1913, insisted that his goat be given a room at his Stockholm hotel so he could have goat's milk—*his* goat's milk—when he wanted it. The Nor-

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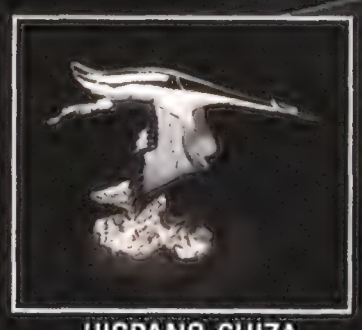

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wegian novelist Knut Hamsun (1920), who needed the prize money, tried to give his award check to a room steward in a burst of boozy generosity—and then inadvertently left it in an elevator. John Steinbeck (1962) lost his check, but it turned up in a friend's purse a few days later.

Another nugget of Nobel nuttiness involved UCLA chemist Donald Cram, who won last year. The Swedish official who telephoned Los Angeles with the news reached another Donald Cram, a carpet cleaner. This Cram understandably thought someone was having fun with him, but he pointed out that "there is chemistry involved in carpet cleaning, too."

Winning a Nobel Prize sometimes changes the victor's life in unwanted ways. Harriet Zuckerman found that the productivity of most science laureates declines after their triumph. Winners as far back as Marie Curie (1903 and 1911) have been swamped with offers and distractions. "One would like to dig into the ground somewhere to find a little peace," she wrote. A more recent laureate prepared a form letter declining a checklist of invitations (to speak, receive an honorary degree and "cure your disease," among others) that he received following his victory. American physicist Arno Penzias, who won in 1978, complained that the prize created an awe barrier in his relationships: "I almost dread the end of a pleasant conversation when someone says, 'It's been an honor meeting you,' instead of saying 'a pleasure.'"

Most critics concede that despite a few slipups the science awards have generally been excellent, and the debates over the Literature and Peace prizes often boil down to subjective questions of taste and politics. "Over all, it's been an enormous success," Zuckerman says.

The reclusive genius who started it all would doubtless have been reflexively skeptical of such success. He himself had scant regard for awards. "I owe my Swedish Order of the North Star to my cook, whose skill won the approval of an eminent stomach," he wrote. "My French order was conferred upon me as the result of a close personal acquaintance with a minister." If Nobel had won a Nobel he probably wouldn't have shown up to accept it.

American novelist John Steinbeck received the Prize in Literature in formal ceremony at Stockholm Concert Hall on December 10, 1962.

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Book reviews

Natural Obsessions:
The Search for the Oncogene
Natalie Angier
Houghton Mifflin, $19.95

Molecular biologists who study cancer rarely talk about finding a cure. Clinical treatment resulting from their research remains too distant, the disease too complex and the hopes of laymen too fervent for scientists to risk voicing optimism. One investigator calls talk about cures "absolutely offensive." Another says that, in a way, demands for immediate applications from research are "childish. We all have to die someday."

They prefer to say they study oncogenes, the genes that cause cancer, because they want to know how the thousands of normal genes in the average human cell work. "Cancer is the cell speaking in hyperbole," Natalie Angier says, and scientists hope that in its hysterical, exaggeration-prone condition, the cell will spill its innermost secrets. Finding a genetic-based cure to some cancers may be down the road, but for now the oncogene simply represents a complicated, elusive puzzle at the heart of life.

Important pieces of this puzzle are being put into place at the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts. Angier, a free-lance science writer and a teacher at the New York University Graduate School of Journalism, spent several months at the Whitehead Institute—though from the extent to which she became involved in the life and work of its scientists, you'd think she'd been there her entire life. Her lengthy but fascinating report from the laboratory revolves around Bob Weinberg, 45, the

institute's bluff, optimistic, effervescent principal investigator, and his staff of about 15 graduate students and postdoctoral fellows.

The Weinberg lab virtually opened the field of human oncogene study in 1978 when it pioneered the development of a procedure called transfection—taking genes from tumor cells and placing them in healthy cells. By restarting cancer in this way, transfection allows scientists to test individual genes for cancer-causing properties. In 1982 it led Weinberg's lab to the first identification of a gene mutation that results in cancer.

First found in human genes in cells from a bladder tumor, this gene, the *ras* (for "rat sarcoma virus," used simply as an identifying tag) oncogene, when it is normal, joins other genes in giving directions to the cell on how to make proteins. Weinberg was startled to learn that the transformation of *ras* into a cancer trigger is caused by a mutation at a single point on its DNA molecule. "If you're tired of the *ras* gene," says one enthusiastic scientist from another lab, "you're tired of life."

These discoveries occurred long before Angier's arrival at the Whitehead Institute, but she exhaustively details the steps and missteps taken by the laboratory as if she had been there. By the time she joined the team it had fallen on hard times, frustrated in its attempts to gain a biochemical understanding of how the *ras* mutation initiates cancer. This was just as well for the purposes of her book.

"It is the stress of failure that lends scientists their character, their humanity," she writes. "Failure makes them interesting."

It does. At times *Natural Obsessions* reads like a novel, as Angier dramatizes the infighting, unproductive competition and hurt feelings that accompany the researchers' failures. Her intimacy with the grad students and postdocs allows her to draw compelling portraits of these young people during periods of great creativity and stress. When the Taiwanese postdoc Mien-Chie Hung is taken off a project, his colleagues bitterly divide between those who blame Weinberg and those who say Hung should have seen it coming. The distraught scientist says he might go back to studying fruit flies. His best friend, Alan Schecter, explodes. "Flies are boring!" he shouts. "Flies are *dead*."

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Natural Obsessions offers to teach readers more than they ever thought they'd learn about molecular biology. While Angier's effort is badly compromised by the absence of explanatory diagrams, she rises to the challenge of expressing complicated information. We might take some cold comfort in the idea that even if cancer is never eradicated, soon it may at least be explained.
Ken Kalfus
Philadelphia science writer

Horatio Nelson
Tom Pocock
Knopf, $22.95

Tom Pocock, a British journalist and the author of three earlier books about Horatio Nelson, investigated more than 40 written sources, inspected innumerable paintings and exhibits, and interviewed historians and members of the Nelson family to write this biography. His father, who taught naval history, impressed upon him the high naval standards set by the admiral. Among the 24 pages of illustrations in *Horatio Nelson* are paintings by other Pococks.

The affection that Tom Pocock feels for the naval hero subtly draws the reader into Nelson's circle of admirers, but such a response is not unique. In 1881, already 76 years after Nelson's death, a lad named Leslie Hammond explained that he wanted to become a naval officer to avenge his friend Nelson. He rose to captain.

As a schoolboy Nelson was audacious and sensitive about honor, qualities he never lost. On a scientific expedition to the Arctic when he was 14 years old, he sought dangerous escapades. As a captain, he joined his men in boarding enemy vessels for hand-to-hand combat. As fleet commander at Trafalgar he directed from the deck in full admiral's uniform, a perfect target for the sniper who brought him down. He once mused, "I know it is in my disposition that difficulties and dangers do but increase my desire for attempting them."

Much more than a hagiography, *Horatio Nelson* points out the vanities, the greedy pursuit of financial rewards, the compromises with honor that Nelson made in his private life—but never as a naval leader. Pocock examines family situations that explain many of Nelson's quirks. Although his mother was related to the famous Walpoles, the Nelsons were not quite socially acceptable, and Horatio observed the benefits of

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money and position from the outside. His mother's death when he was 9 conditioned him to look for the unwavering approval and warmth of a maternal kind of love. He respected his clergyman father's standards so much that his marital infidelity made him uncomfortable with the old man, although the elder Nelson never reproached his famous son.

From his uncle, Capt. Maurice Suckling, he learned about the respect given to naval officers. At 12, Horatio sailed to the tropics as a midshipman. He had already developed a knack for making friends—useful friends with good connections. Adding such helpful patronage to his own self-confidence and genial disposition, he could not fail.

Pocock has traveled to most of the places of importance in Nelson's life. His descriptions capture the essence of English villages and pubs as well as the excitement of Vesuvius and the feverish jungles of Central America.

Napoleon Bonaparte's threats to Great Britain gave Nelson the opportunity to become a hero and to die at Trafalgar. A stickler for rules, Nelson often offended bureaucrats, but to the British sailor there was no better man. Pocock notes that Nelson was recalled to duty for his morale-building effect as well as his seamanship. A bos'n's mate, grief-stricken at Nelson's death, could not pipe the men to quarters. "Hang me, I can't do it . . . I can't think of parting with Nelson."

Nelson's relationship with the Hamiltons has attracted more attention than his heroism at sea. His fascination with Emma, a "kept woman" by the time she was 16, confounded Nelson's friends. Sir William Hamilton, Minister Plenipotentiary to the Kingdom of the Two Sicilies, had shocked his friends when, at 60, he married the 26-year-old beauty. "This bizarre couple," as Pocock calls them, were equally captivated by Nelson. They became the *tria juncta in uno* (three joined in one). Sir William was so devoted to Nelson that he looked the other way as an intimate relationship developed between Horatio and Emma (*Book reviews*, January 1988).

Once Nelson had met Emma, his own wife Fanny never stood a chance. While Nelson fought, Fanny fretted. "Hard is the lot of a sailor's wife," she complained. Her letters to him urged caution; Emma's were romantic outpourings that praised his bravery. On shore Emma mothered him. Later, in England, she decorated a home for him and brightened it with family gatherings. She also gave birth, in 1801, to his daughter, Horatia.

Nelson did not look like a hero or a Don Juan. He was small, sallow-skinned, plagued with fevers and pains; his health deteriorated steadily. At 40 he had lost one arm, vision in one eye, and some of his upper teeth, causing his cheeks to sink. Two years later, a German who saw him traveling through Dresden described him as a "miserable collection of bones . . . he speaks little . . . he hardly ever smiles."

Yet Englishmen gathered to see him go off for duty, to touch his sleeve, to weep and to pray for him. They ignored his last wish—that they should consider Emma and Horatia as his legacy to his country and take care of them, but they buried their 47-year-old hero at St. Paul's Cathedral in an emotional four-hour ceremony. They have built memo-

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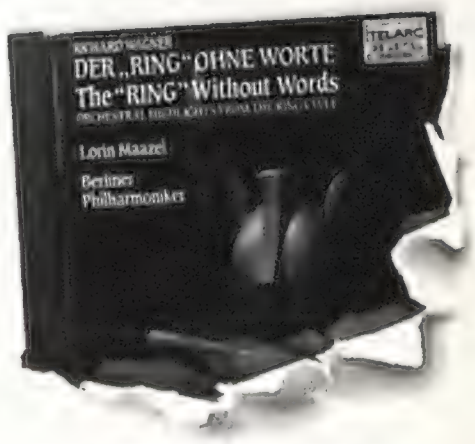

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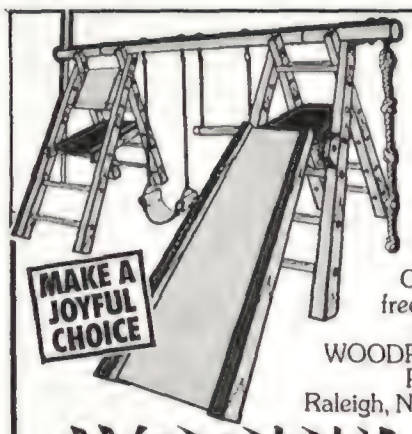

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Geraldine R. Foty
Massachusetts book reviewer

The Da Capo Guide to Contemporary African Music
Ronnie Graham
Da Capo Press, $13.95 (paper)

In 1956, when Louis (Satchmo) Armstrong visited Africa for the first time (accompanied by Edward R. Murrow, who was filming a report for his televison show *See It Now*), his records had already guaranteed him a star's reception. The government of Ghana spared no expense, and when Armstrong's plane touched down in Accra, thousands were waiting. Government functionaries spoke. Africa's most popular comic clowned. And a massed band of Ghana's finest dance-band musicians played under the leadership of E. T. Mensah, renowned as Ghana's, and perhaps Africa's, greatest bandleader. The tune they selected was called "All for You," and they chose it because it was Ghana's most popular song at the time and Mensah's finest composition. Armstrong, it turned out, knew the tune already. As a child in Louisiana, he'd heard black workers singing it in the fields.

Ronnie Graham doesn't tell that story in *The Da Capo Guide to Contemporary African Music*, but it illustrates vividly the fluid, vibrant state—rooted in the past, nourished by the present—of modern African popular music.

Africa has no such thing as "classical" music, meant to be absorbed by a passive audience. Traditional African music is a communal experience, and the continent's modern, urban music, derived from traditional forms but influenced by countless other forces, retains that esthetic: it's music meant for dancing.

Music fans and record collectors outside Africa know about *kwela* and *mbube* of South Africa, and *mbalax* from Senegal. America has been slower than Europe to catch the beat, but even so, the first half of 1988 saw American tours by the Bhundu Boys of Zimbabwe; Johnny Clegg and Savuka of South Africa; Sunny Ade of Nigeria; Youssou N'Dour of Senegal; and Salif Keita of Mali. Clubs like Kilimanjaro in Washington, D.C., the Music Machine in Los Angeles and S. O. B.'s (Sounds of Brazil) in New York regularly pack the house with African bands, and *Reggae and*

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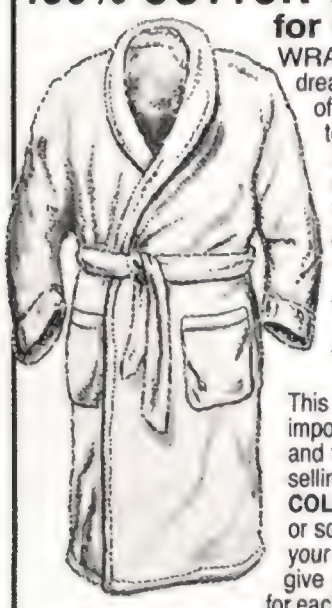

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The story of Africa's urban dance music in the last four decades allows an observer to see an art form changing and growing in response to specific stimuli. Nothing is irrelevant, and Graham covers it all. Specific events as varied as the following all have had an immediate impact on the music of different cultures: British military band members in Ghana and Nigeria teaching Africans to play brass instruments, and jamming with them in clubs; the importation of Cuban rumba records in the 1950s and of inexpensive electric guitars in the 1960s; the introduction of the audiocassette; soul singer James Brown touring Africa in 1969; reggae king Bob Marley touring Africa in 1980; political unrest in Zaire that caused many musicians to record in Paris; the opening of new recording studios in Lome, Togo; the recent start of a radio station in Libreville, Gabon, that broadcasts 18 hours of African music every day to most of Central and Western Africa; the stationing of Cuban troops in Angola. Today's Africa, increasingly detribalized and urbanized, both the source and the focus of Western popular music, is in the forefront of modern musical innovation.

Two books on the subject have preceded Graham's: *African Pop; Goodtime Kings* by Billy Bergman (1985) and *African Pop Roots* by John Collins (1985), both general introductions to the subject. But Graham's book, his first, is a detailed and systematic study, the first of its kind, a genuinely pioneering work and a landmark in the literature of popular music in our time. Graham has organized an enormous body of material (musical, social, historical, economic, political) into a usable but readable reference format aimed, most sensibly, at record buyers. With general histories of each nation's music, linguistic maps, individual biographies of musicians, a bibliography, and extensive discographies, the book is indispensable for any really thorough understanding of Africa today. The continent may be filled with social struggles, civil unrest, dictatorships, drought and famine, but it has another, brighter life, too. It's bursting with music.

I recently met, at a lunch given by Angola's Permanent Mission to the United Nations, a group of journalists interested in African music and litera-

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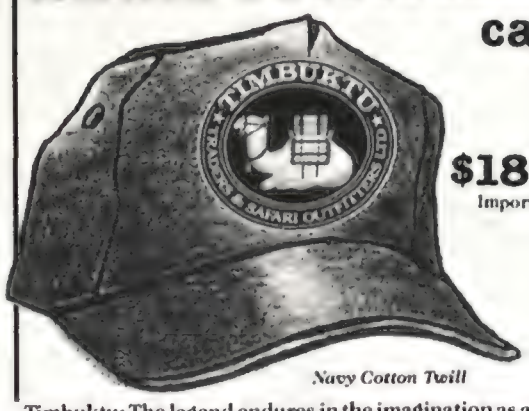

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ture. Among the guests was a reporter recently posted to Nairobi by a major American newspaper. Charged with reporting on an entire continent, this correspondent knew little of Africa, less of its literature and nothing of its music. It seems to me that a book like Ronnie Graham's could teach that reporter more about Africa, its peoples, the ways they live and think, than could a mile-high pile of economic analyses.

In writing about popular music, Graham brings to life an entire continent of diverse peoples who are today using one of their oldest and finest arts to reach beyond themselves, into the First World and into the 21st century. The only thing better is the music itself.

Alan Ryan
New York novelist

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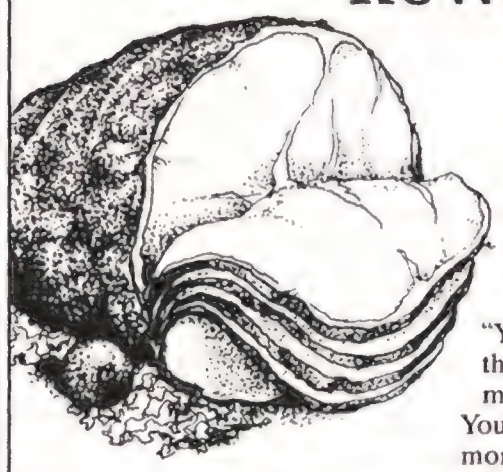

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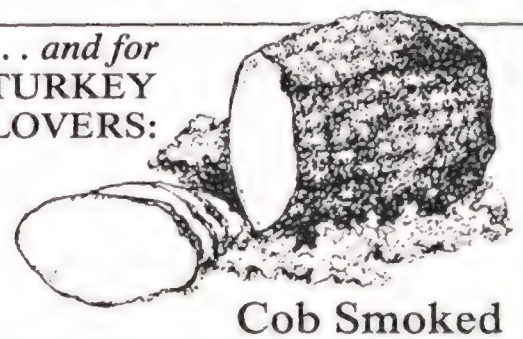

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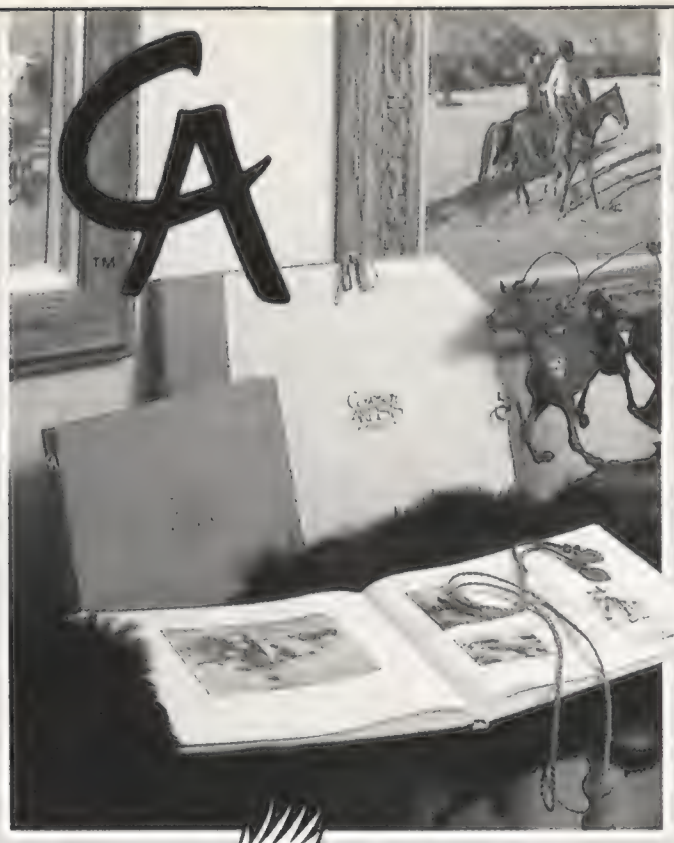

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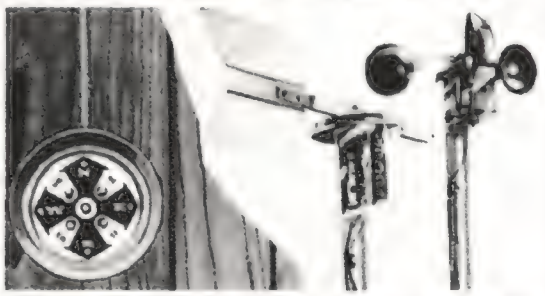

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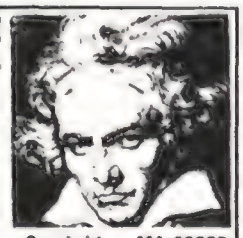

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Hirshhorn Museum & Sculpture Garden
Alberto Giacometti: 1901-1966 (through November 13) The first American survey since 1974 to honor the Swiss artist.
Directions: Walter Pichler (through January 22) Fantastical drawings by the Austrian artist.
Krzysztof Wodiczko: Works (through January 22) Videotapes by the Polish-born artist.

National Museum of American History
The American Presidency, 1789-1989 (through June) More than 400 objects and photographs.
Commemorating New Sweden (through January 31) A 350th-anniversary look at the first Swedish settlers and their Algonquin neighbors.
There's No Business Like Show Business: Irving Berlin's Centennial (through January 31) Homage to the composer.

National Portrait Gallery
On the Air: Pioneers of American Broadcasting (through January 2) The golden age of radio and television through portraits and memorabilia.
Polaroid Portraits (through December 4) Remarkable Polaroid images.

National Museum of Natural History
Crossroads of Continents: Cultures of Siberia and Alaska (through April 2) First jointly curated Soviet-North American exhibit ever: traditional cultures seen through 500 artifacts.
Uksuum Cauyai: The Drums of Winter (November 4: noon; November 5: 1 P.M.; November 6: 2 P.M.) Documentary on drummers and dancers of a Bering Sea coastal village.

International Gallery, S. Dillon Ripley Center
Tropical Rainforests: A Disappearing Treasure (through January 2) Floor-to-ceiling film screens, photos, models.

National Air and Space Museum
European Space Agency Overview of recent scientific missions.
Focus on Flight (through April) Forty prizewinning photographs from the NASM-sponsored contest.
Native American Skylore (November 22; 7:30 P.M.) Free lecture by Ellen Sprouls of NASM.

Cooper-Hewitt Museum (New York)
Erich Mendelsohn: 1887-1953 (through January 8) Drawings encompassing the career of a major architect.

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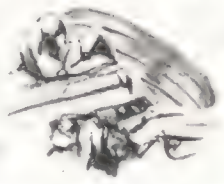

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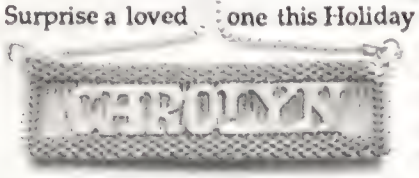

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Burghley House: The Countess' Gems (through November 27) Jewels and ornate stone vessels.

Renwick Gallery

Stephen de Staebler: The Figure (through February 12) Thirty-five clay and bronze life-size sculptures.

American Art Pottery, 1880-1930 (through February 5) Seventy-five American Art Pottery pieces.

Exhibition catalogs

Catalogs available currently include:

Alberto Giacometti (paper, $24.95; cloth, $50)

Crossroads of Continents: Cultures of Siberia and Alaska (paper, $24.95; cloth, $45)

Stephen de Staebler: The Figure (paper, $19.95)

On the Air: Pioneers of American Broadcasting (paper, $24.95)

To order, send check or money order to Museum Shops, Box 44083, Washington, D.C. 20026-0083. Include 15 percent of total purchase to cover postage and handling (minimum, $1.75).

Contributing Membership Program

The Membership supports the Institution's work in education, research and scholarship. Partially tax-deductible contribution categories are: Supporting, $60 (for non-D.C. area residents only); Donor, $125; Sponsoring, $300; Sustaining, $600; Patron, $1,200; James Smithson Society, $2,000. Contributing Members enjoy privileges in addition to the benefits of Smithsonian Associates. Write the Contributing Membership Program, 1100 Jefferson Drive S.W., Washington, D.C. 20560 or call (202) 357-1699.

Smithsonian on the air

Radio Smithsonian: Features include stories on a Civil War burial site, Hoagy Carmichael, and the horseless carriage.

Here at the Smithsonian: Three-minute presentations take you behind the scenes. To find out what stations carry these radio and TV programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.

Smithsonian World: The new season continues with "American Dream at Groton," the story of how one century-

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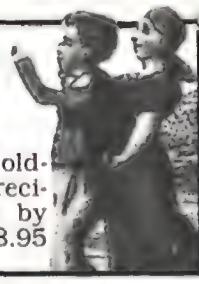

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Lecture and Seminar Program

Lectures on Southeastern art, historic preservation, aviation, nature photography, American folk songs come to Jackson, Mississippi, November 3 through 6.

For further information, write to the Lecture and Seminar Program, 1100 Jefferson Drive S.W., Room 3045, Washington, D.C. 20560, or call (202) 357-1350.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call 357-3030. Here are some November events:

The 1988 Election: Bush, Dukakis, Jackson—An Evening with Roger Wilkins (November 29; 8 P.M.) The distinguished journalist and public servant inaugurates the George Mason University Lecture Series.

Little Dorrit (November 20: Part I, 2:30-5:30 P.M.; Part II, 7:30-10:30 P.M.) Washington premiere of Dickens' masterpiece on film with Alec Guinness and Derek Jacobi. Dinner available.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some November exhibits:

Atlanta, Georgia (November 5-December 4) *Official Images: New Deal Photography,* Carter Presidential Library.

Baltimore, Maryland (November 15-January 8) *Threadworks: Miniature Textile Art,* Baltimore Museum of Art.

Charleston, West Virginia (November 26-January 1) *Impressions of a New Civilization: The Lincoln Kirstein Collection of Japanese Prints, 1860-1912,* Sunrise Museums Inc.

Cleveland, Ohio (November 2-January 8) *Views of Rome: Watercolors and Drawings from the Collection of the Biblioteca Apostolica Vaticana,* Cleveland Museum of Art (see *Highlights continued,* page 240).

Omaha, Nebraska (November 26-December 25) *Black Wings: The American Black in Aviation,* Great Plains Museum.

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Highlights continued

A collector's Roman cache

For more than 40 years, Thomas Ashby, the eminent British classical scholar, bicycled and trekked across every foot of his beloved Roman countryside. From the 1890s on, the crumbling splendors of that ancient landscape captivated his imagination and inspired a passion for collecting. He pored over rare books and manuscripts, sifted through archives and sought out sketchbooks, searching with a connoisseur's devotion for documentation of Roman monuments and ruins.

By the time of his death in 1931, Ashby also had amassed some 6,000 prints and 1,000 drawings. "Views of Rome," opening November 2 in Cleveland, introduces 85 of his treasures to a public who, until now, would have had to journey to the Vatican Library. (Armchair travelers also will delight in the catalog.)

Works including Jan Bruegel's drawing of the Colosseum and Jean Grandjean's panorama of the country near Frascati offer an alluring reprise of Roman enchantments. Countless pilgrims held in the sway of the Eternal City are represented as well: images are accompanied by commentary from Dickens to Goethe, Henry James to Vasari.

The show, sponsored by SITES and the Biblioteca Apostolica Vaticana, continues to Indianapolis, New York City, Santa Barbara, Chicago and Montreal.
Kathleen M. Burke

Architect-artist Giacomo Quarenghi drew Arch of Constantine during 1770s.

Ferdinand Becker's precise rendering, 1780s, depicts bridge built by Hadrian.

Moonlit vista by Richard Wilson, 1750s, evokes Roman terrain in all its poetry.

Dutch artist Jacob Van Der Ulft imagined this classical rotunda as it appeared before incorporation as sacristy of St. Peter's basilica in 1500s.

Watercolor by Jakob Philipp Hackert, 1760s, records fading beauties: Colosseum (right) choked by vines and rubble, and temple complex (left).

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Domestic Study Tours

Smithsonian Sampler Weekend November 11-13: For all ages. Private tours highlight collections at selected museums.

Christmas at the Smithsonian December 2-4: Welcome the holidays with tours, music and festive dining.

Christmas in Asheville December 23-26: Celebrate the holiday at North Carolina's historic Grove Park Inn; includes candlelight tour of majestic Biltmore Estate.

Hawaii January 22-February 3 or February 12-24: Explore the diversity of four islands on this active nature tour.

Florida Springs February 6-10: Canoe the freshwater springs of central Florida and see the endangered West Indian manatee.

Death Valley March 7-16 or 20-29: Explore the mountains and canyons of the Mojave Desert area on foot and by van.

Big Bend March 22-31: Hike in this wild and scenic park; also visit Carlsbad Caverns and McDonald Observatory.

Sojoûrn in Tucson April 1-8 or 15-22: Local experts provide an overview of the area's multiethnic folklore and natural history.

Savannah-Charleston April 2-9: Learn about historic homes and gardens in these graceful Southern cities.

Renaissance Miami April 5-10: Enjoy the city's culture, design. Stay in Coral Gables at the elegant Biltmore, a "boom years" creation recently restored to its former splendor.

Delta Queen April 7-14: Take a steamboat journey into America's past on the lower Mississippi from New Orleans to Memphis.

Okefenokee May 2-7: For novice or expert canoeists; discover the beauty of this wildlife refuge near Jacksonville, Florida.

Southwest Indians May 5-14: During this in-depth look, travel to Phoenix, Chaco Canyon and Canyon de Chelly. Meet craftsmen, visit museums and private collections.

Foreign Study Tours

People's Republic of China A variety of tours in 1989 for new and repeat travelers.

Smithsonian Christmas Enjoy the holidays on Fiji, in the warm climate of New Zealand, or in one of four idyllic European settings including England (Winchester or Canterbury), Austria and Switzerland.

Antarctica and Falkland Islands December 27-January 12: Aboard the M.V. *Society Explorer*, thrill to spectacular scenery, visit research stations, photograph wildlife.

Mesoamerican Study Programs January and February: Yucatán, El Tajin or Guatemala.

Backstage London January 3-12: Attend traditional and avant-garde productions, meet performers backstage.

South America Voyage January 6-30: Cruise from Rio to Santiago through the Strait of Magellan, Beagle Channel *and* around Cape Horn. Includes Iguaçú Falls.

India Wildlife Safari January 22-February 18: Travel by elephant and jeep to observe rare species of birds and animals.

Kenya-Tanzania Wildlife Safari January 26-February 12: Unique journey to East Africa.

NEW Leningrad Arts Seminar January 27-February 8: Overview of art, architecture, history with visits to the Hermitage and Russian museums. Pretour program in Washington features Hillwood's collection.

Australia-New Zealand February 5-28: A highlights tour that includes wondrous wildlife and intriguing cultures.

NEW Paris in Winter February 8-17: Experience art, theater, commerce, cuisine and more, in the quiet of the off-season.

Red Sea Passage February 16-27: The splendors and mystique of ancient Egypt are revealed during this exotic ten-day cruise. Ends in Cairo.

NEW Jamaica February 26-March 8: Study the customs and culture of this delightful West Indian island.

NEW Budapest Music Festival March 15-26: International performers gather to celebrate musical traditions.

NEW Sea of Cortez March 19-29: Cruise Mexico's Gulf of California. See blue whales and other wildlife. Disembark at Manzanillo, near famous Las Hadas resort.

Costa Rica March 25-April 8: Learn about flora, birds and other wildlife in the American tropics.

Kyoto Seminar March 25-April 9: Reside in a traditional Japanese ryokan. Explore language, history and culture.

Berlin April 12-26: An intimate look at fabulous Berlin, East and West. Includes travel to Dresden, Wittenberg and Weimar.

Danube Voyage May 23-June 9: Cruise from Rumania to West Germany aboard the *Theodor Körner*. Study the art and history of countries linked by this major waterway.

NEW Cotswold Walks May 25-June 6: Get acquainted with the English countryside on foot—along ancient ways through woods, farms, glorious pastures and picture-book villages.

Cities of Central Asia May 27-June 8: Begin in Leningrad, then fly to Samarkand and Bukhara. Ends in Moscow.

Florence Seminar May 27-June 11: Live in an elegant villa-hotel, study the Renaissance.

Greece May 29-June 12: Marvel at classical wonders and beautiful landscapes from Athens to Thessaloníki.

Wild Highlands of Scotland June 3-17: Reside at Aigas Field Centre and enjoy spectacular walks. Study this area's cultural and natural history.

Turkey's Eastern Reaches June 7-24: Travel east from Ankara and rediscover the ancient Orient, land of the Hurrians, Hittites, Georgians and early Turkic tribes.

Poland June 9-25: Explore a rich cultural heritage in Warsaw, Kraków and other colorful cities.

Cave Art in France and Spain June 19-July 4: Discover the best of primitive cave art. Visit the Cantabrian and Basque coastlines, the foothills of the Pyrenees and the valley of the Dordogne.

Write Smithsonian National Associates, 1100 Jefferson Drive SW, Washington, DC 20560 or call (202) 357-4700 for tour brochures

Washington

Smithsonian Seminars

Washington, D.C. January 11-14
Join fellow Associates in seminars designed to meet your special interests.

New Perspectives on the Impressionists
Gain new insights into the work of Manet, Morisot, Gauguin, Degas and others. Tour the superb Impressionist collections at the National Gallery of Art and the Baltimore Museum of Art.

Where's the Melody: American Jazz Favorites
Listen to masterpieces by Jelly Roll Morton, Louis Armstrong, Duke Ellington and more during music-accompanied lectures by renowned jazz scholar Martin Williams, who selected and annotated *The Smithsonian Collection of Classic Jazz.*

The Homestead
Hot Springs, Virginia, January 22-26
Enjoy a winter break at the famed resort in the beautiful Allegheny Mountains of western Virginia. Discover the Homestead's unique combination of architectural beauty, Southern grace and superb guest amenities as you choose between two stimulating seminars.

The Art and Craft of Creative Writing
Study the fine points with Edwards Park, author of SMITHSONIAN's monthly column *Around the Mall and beyond.*

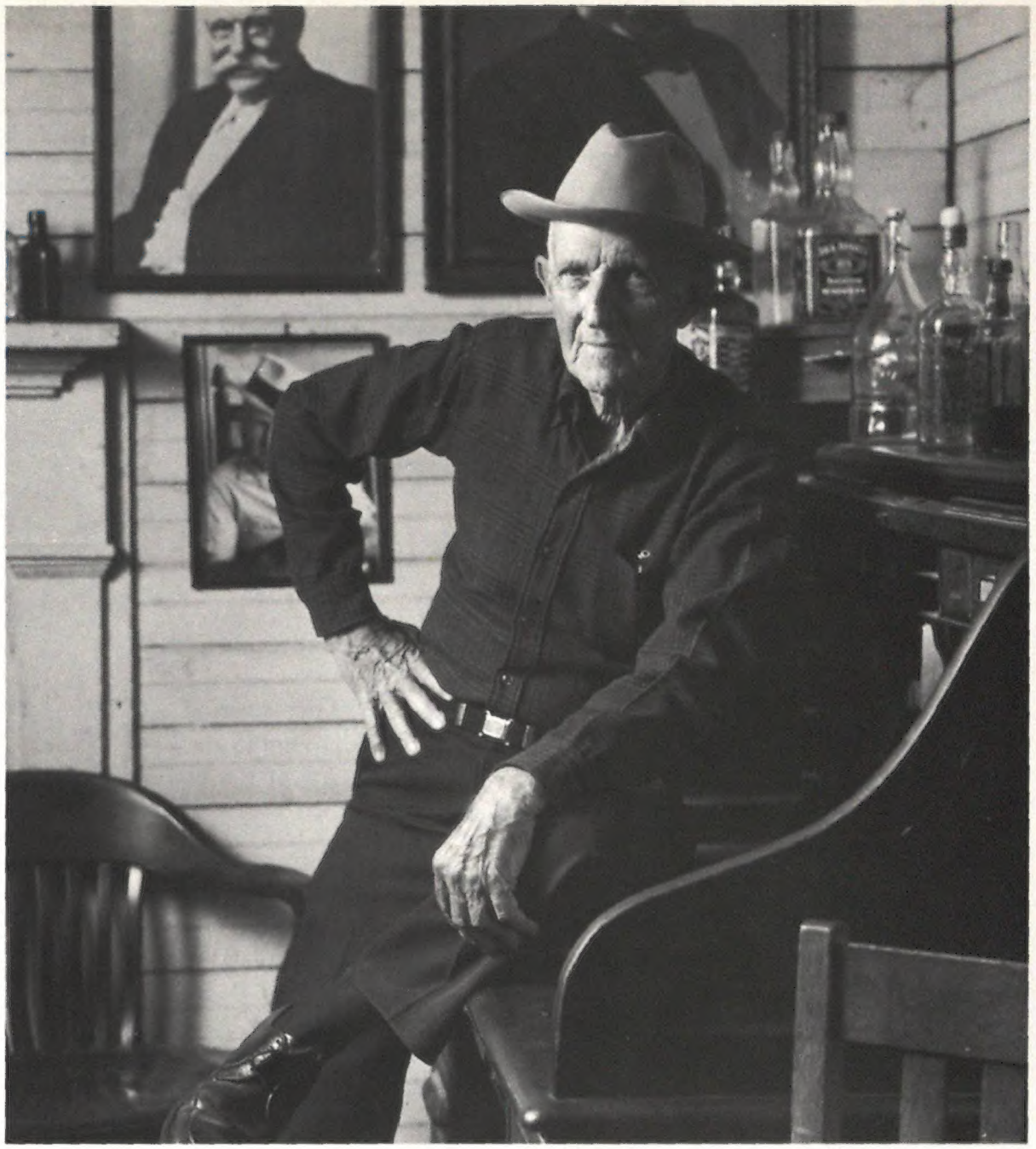
American Popular Song
Relive America's glorious golden age of song with acclaimed jazz pianist John Eaton, who discusses and performs the works of Gershwin, Porter and Berlin.

The Broadmoor
Colorado Springs, Colorado
February 22-25
Spend four exhilarating days at this Colorado landmark resort situated on more than 3,000 acres of rolling foothills. Enjoy elegant dining and excellent sports facilities after daily seminar sessions.

Highlights of Aviation History
Trace major developments in civil and military aviation with E. T. Wooldridge and Claudia Oakes of the National Air and Space Museum. Tour the U.S. Air Force Academy and NORAD headquarters at nearby Cheyenne Mountain.

American Popular Song
Jazz pianist John Eaton repeats his course for Associates (see listing above).

or (202) 357-1350 for seminar brochures.



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By Felicia Lamport

'The bass swam around the bass drum on the ocean floor'

I was having lunch at the faculty club with a recent acquaintance when a young man approached my table, handed me a slip of paper, said "Two more" and walked away. My companion and I were just beginning to discuss the project that we had agreed to lunch about when another man came up, gave me another slip of paper, said "Three, maybe four" with an air of quiet triumph and left. A woman dropped off the next slip. "Only one this time," she said, "not a large number, but after awhile the mind tends to grow number."

"Would it be presumptuous to ask what this is all about?" my vis-à-vis said.

"Not at all," I said. "It's a kind of game—trying to find a word that has two separate pronunciations, two distinct meanings, but only one spelling. Word games used to be used more often, but it's a subject I didn't intend to subject you to since you're an economist." He looked slightly annoyed. "The last economist I tried it on got his wind up before I'd even had a chance to wind up," I explained. "This is more likely to appeal to literary people."

"Economists are not necessarily illiterate," he said. "Can you give me an example or two?"

I handed him the slip the first man had given me. He unfolded it and read aloud: "*The bass swam around the bass drum on the ocean floor.*" He paused to blink, then continued: "*The buck does odd things when the does are in heat.* . . . You sure this isn't some sort of a private code?"

"Something I'd only intimate to my most intimate friends?" I said. "By no means." I handed him the slip the woman had given me, sure that it would be a good one; her mind moves so supply that she had already added a dozen to the total supply.

"*A crow can scatter wheat seeds, but can a sow sow corn?*" he read, and laughed, but I sighed because the example duplicated one that had already been given me by a physicist obsessed with the game. "Oh, sao-so!" my lunch companion said. "I get it. But what's the problem? There must be dozens of words that meet your three conditions."

"They're rather hard to find. Name one if you can."

His silence lasted quite awhile but his lips kept moving.

"Are you having dessert?" the waitress asked.

"After dessert she deserted . . ." he started off happily, but I interrupted with: "No good; the spelling must be the same."

"Oh." Then after a pause, "But suppose I said: 'She wished she could desert him in the desert'?"

"On the nose—same spelling, two meanings, two pronunciations."

"Give me a few more from your approved list," he said.

"A couple should be enough to present you with at present. First, a rather sweet one: 'After watching the seagull dive for a fish, the dove dove.'"

"Lovely," he said. "Go on."

"OK, a final example," I said. "'The town dump is so full that it may have to start to refuse refuse. And if that makes the mayor blow his fuse, who will refuse him?'"

"That's a double," he said accusingly, and then added on with sudden inspiration: "When my mother-in-law accompanied us on our honeymoon trip to Niagara, I nearly threw the old dam over the dam."

"Two-thirds OK, but the pronunciation is the same in both."

"Damn," he said. Then, after a pause: "How about: 'In trigonometry, the sine is a *sine qua non*'?"

"Sorry," I said gently, "foreign languages don't count. Although one contribution, 'It's unwise to rub pâté into one's pate,' struck me as so charming that I was tempted to give it a visa."

"Why not?" he said. "Must you be so intransigent?"

I sighed. "You make me feel that my sole object is to object. But I allow one great exception: 'Man's laughter can be crueler than manslaughter.'"

"That's really awe-inspiring. Do these things have a name?"

"Of course: heteronyms, logical relatives of synonyms, homonyms and antonyms."

The next morning's mail brought seven sound ones from my lunch companion—not a bit to my surprise. Heteronyms spread like happy rumors, perhaps because they're so useful in warding off insomnia, migraines or irritation with airplane delays. A two-page list came from a paleoanthropologist on the same day that a novelist swam up to me on Martha's Vineyard and said, "I saw the weirdest thing in town: a hand reaching up from a manhole wielding a threaded needle. It's the first time I ever came upon a sewer in a sewer."

We are, I think, coming close to a close with the contents of the master list, combining the inspirations of several score heteronymophiles for a 49-word total, including 16 you may or may not have spotted on this page.

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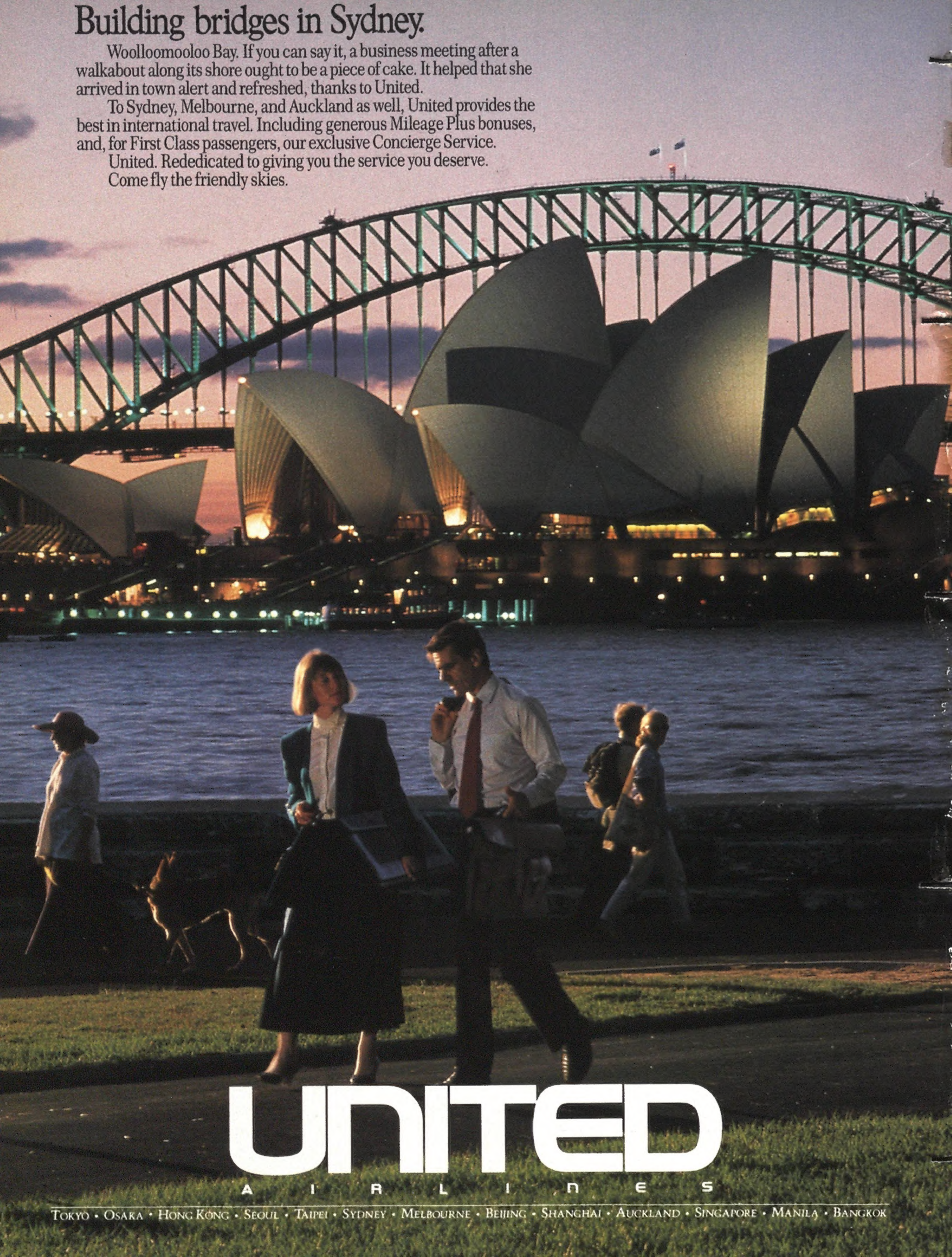

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